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Canada, Parliament, Senate
Special Committee on Lead use
Proceedings



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Fourth Session—Twenty-fourth Parliament
1960-61

THE SENATE OF CANADA

PROCEEDINGS OF

THE SPECIAL COMMITTEE OF THE SENATE

ON

LAND USE IN CANADA

No. 1

(REVISED COPY)

THURSDAY, FEBRUARY 2, 1961

The Honourable Arthur M. Pearson, Chairman
The Honourable Henri C. Bois, Deputy Chairman

WITNESS:

Mr. Gavin Henderson, Executive Director, The Conservation Council of
Ontario.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Higgins	Power
Basha	Horner	Smith (<i>Kamloops</i>)
Bois	Inman	Stambaugh
Boucher	Leger	Taylor (<i>Norfolk</i>)
Bradette	Leonard	Taylor (<i>Westmorland</i>)
Buchanan	MacDonald	Turgeon
Cameron	McDonald	Vaillancourt
Crerar	McGrand	Wall
Emerson	Méthot	White—31.
Gladstone	Molson	
Golding	Pearson	

(Quorum 5)



1085825

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

"The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Blois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—

Resolved in the affirmative."

J. F. MacNEILL,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

THURSDAY, February 2, 1961.

Pursuant to adjournment and notice the Special Committee of the Senate on Land Use in Canada, met this day at 10.30 a.m.

Present: The Honourable Senators: Basha, Gladstone, Higgins, Inman, Leger, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*) and Turgeon.

In the absence of the Chairman, and on Motion of the Honourable Senator Golding, the Honourable Senator Taylor (*Westmorland*) was elected Acting Chairman.

In attendance: Mr. Ralph A. Stutt, Special Consultant to the Committee, and the Official Reporters of the Senate.

Mr. Gavin Henderson, Executive Director, The Conservation Council of Ontario, presented a brief, was heard and questioned.

At 12 Noon the Committee adjourned to the call of the Chairman, tentatively set for Thursday, February 9th, 1961.

Attest.

James D. MacDonald,
Clerk of the Committee.

THE SENATE

SPECIAL COMMITTEE ON LAND USE IN CANADA

EVIDENCE

OTTAWA, Thursday, February 2, 1961.

The Special Committee on land use in Canada met this day at 10.30 a.m. Senator A. C. TAYLOR (*Westmorland*) (*Acting Chairman*) in the Chair.

The ACTING CHAIRMAN: Gentlemen, I thank you for your confidence in me, in choosing me as your chairman today, and I hope I shall justify that confidence.

Senator GOLDING: You are an old hand at it.

The ACTING CHAIRMAN: I am sorry Senator Pearson is not here because I know he is greatly interested in this subject, but in any event, since he is not here, we shall have to go on.

The only brief we have today is one which is being presented by The Conservation Council of Ontario. It has to do with land use and Mr. Henderson is here representing the council. Without any further remarks I will ask Mr. Henderson to present his brief.

Mr. G. Henderson, Executive Director, The Conservation Council of Ontario: First of all, Mr. Chairman, I would like to say how glad we are of this opportunity to appear before your Committee. Before I give the brief, may I take a minute to say something about the Conservation Council and its work.

The Council was established in 1952 as an educational non-profit, non-political conservation body. Its aims are chiefly educational and advisory to governments.

The member organizations of the Council are listed in a green folder which has been distributed among you and, as you will see, they represent a very broad range of interests in the field of resources and management.

The Council operates mainly through its standing committees, undertaking studies of various resource problems, results of which are published and widely distributed. Part of this educational programme is carried out by means of conferences and seminars. We are financed by an annual grant from the Canadian National Sportmen's Show, which is held each year in March, in Toronto.

You will find other information about the Council in the directory of the folder.

The brief reads: When the Conservation Council of Ontario was organized in 1952 its first undertaking was the preparation of a report on soil and water conservation. This report was the result of a comprehensive study of the influences considered to be significant at that time. It is interesting to note however, that nowhere in the report was reference made to competition for the use of land as being one of these influences.

Land competition in Ontario, as in some other parts of Canada, has since become one of the major resource problems with which we are faced. Certainly the loss of some of our best farmland as a result of unplanned and often unwarranted encroachment has become a matter of far greater concern in Ontario than damage resulting from improper cropping and tillage practices.

Land which has been misused can in most cases be restored. On the other hand, land once it is alienated for highways, airports, and urban and industrial development, or which becomes sterilized by urban sprawl, is lost to agriculture forever.

Problems associated with competition for the use of land in Canada are a relatively new phenomenon. That they should exist at all is for many people hard to understand. What most Canadians fail to take into account, however, is the fact that vast though this country is and rich though it may be; only 7% of the land is occupied and only 4% improved. Our climate, soils and topography put much of the country on the verge of habitability. As Dr. Wreford Watson, formerly Chief Geographer of Canada, once said:

"Our really favoured environments are so few, and they cover such a small part of the total land area, that there is the fiercest competition for their use. Indeed it could be argued that the competition for them is little inferior to that which rages in a small country like Britain. It is completely erroneous to believe that because we are so large, there is no pressure for space and, therefore, that we are not in need of planning. The sooner we kill that idea in Canada the better.

The realization that land now considered suitable for development is limited and that planning is necessary in order to make the best use of what we have began to dawn on the people of Ontario in the period of economic expansion immediately following the war, chiefly as a result of encroachment by industry and housing of the fruitlands in the Niagara Peninsula. Land use problems in Ontario, therefore, were initially thought of in terms of agriculture only and in the minds of many this is still the case.

The Conservation Council of Ontario, however, is of the opinion that it is not feasible to attempt to deal with problems of land competition as they affect agriculture without consideration of the total needs of the Province for land for all other purposes, both now and in the future.

In spite of the fact that the Province of Ontario covers an area of more than 400,000 square miles, 75% of the population and indeed 18% of the whole population of Canada live in the six counties fronting Lake Ontario between Oshawa and Niagara. By the year 2000 it is forecast that there will be twice as many people living in Ontario as at present, with the greater part of this increase taking place in the already heavily populated south.

With the tremendous economic expansion which will doubtless accompany this growth, we are faced with two major tasks: firstly, that of maintaining renewable resources undiminished or increased for future generations; and secondly of ensuring that any given area is not just a place in which to exist but rather a good place in which to live.

To accomplish these objectives, land use planning on the broadest possible scale is essential. In its Report on Land Use, the Conservation Council pointed out six steps which it considers necessary to achieve optimum land use planning. These are:

The compilation of an inventory of the natural resources, including those of the rocks, soils, forests and waters.

The recording of the present use of the land surface in map form.

The compilation and appraisal of the present regulatory powers and administrative responsibilities that control or influence land and resource use.

The establishment of a public policy concerning the use of land and resources, based on what we have, how we are now using the land, and how we can best use our land for the future.

The creation of a land use plan to fulfill the desired policy.

The creation of the administrative machinery to implement the plan.

SOILS AND LAND USE

Of the 33 million acres in Ontario south of the Precambrian Shield, about 20 million acres are at present being farmed, although only 12 million can be considered good land. If Ontario is to remain the industrial centre of Canada, it must have access to low-cost food. Likewise, the farmer must be able to earn a living comparable to that of his city neighbour. This is only possible if yields per acre are increased and if the full potential of the good soils is realized. Every step which removes part of the 12 million acres of good or prime land from agricultural uses drives agricultural production onto poorer land and means ultimately an increase in food production costs.

Within the past few years some of the best farmland in the Province has gone out of production for non-agricultural purposes. Though the amount of land actually used for these purposes is not too significant in itself, it is the irrational way in which development has taken place and is still taking place that gives cause for concern.

In its Report on Land Use, the Conservation Council estimated that the amount of additional land needed for urban purposes by the year 2000 would not exceed 1½ million acres. The danger with which we are faced, therefore, is not the amount of land occupied or to be occupied by urban development, but the total area of prime agricultural land that is being spoiled for crop production because of the haphazard manner in which premature subdivisions and individual houses are spreading out over the countryside adjacent to almost every city and town in southern Ontario.

The Effect of Taxation

With the demand for new schools and other services which this process generates, higher taxation for the farmers and decay of the farm community inevitably follows. Most farming involves long-term planning, whether it be to re-seed a field, build new fences or plant a new orchard. No farmer will gamble on making these capital expenses if there is a threat of confiscatory increases in taxes.

If, therefore, land is to remain in agriculture anywhere near our large cities and is to be farmed properly, assurance of realistic taxation is a prerequisite. Immediately the tax level threatens to become too high, the land is either forced into idleness, condemned to exploitation farming, or else broken up for sale in residential parcels. The key to tax stability for agricultural land lies of course in establishing a uniform assessment base for farmland, irrespective of where it is located within the jurisdiction of the taxing authority.

The Effect of Roads

A new road affects vitally not only the region or community it serves, but also every point adjacent to its route. This is clearly reflected in the increased land values which almost invariably occur in rural areas whenever a highway is built across them. These increased prices are merely anticipating a changed land use.

It is predicted by many planners that the new communities of the future will consist of strip cities built along the super highways. Certainly the building of the Queen Elizabeth Highway to Niagara changed the land use pattern in the areas adjacent to it, promoted urban development and condemned much of the fruit land. This trend towards strip development will accelerate, placing a major onus on highway planners to consider carefully the land use implications inherent in the selection of their routes and interchanges. Admittedly engineering factors must be carefully considered in making a route

selection. Almost invariably, however, alternate routes are possible. Too often the route selection is made solely on the basis of minimum cost to construct without weight being given to the over-all effect on the national wealth. In other words we must build the highways to the minimum cost by realizing that this cost is the minimum social cost, which must be distinguished from the minimum cost to the Department of Highways. Highway route selection should take into consideration at least the following land use factors:

- (a) The effect on agricultural development, e.g. will the new route result in important agricultural land going out of production unnecessarily, when this would not have happened by making an alternative route selection.
- (b) The effect on land values.
- (c) The effect on the development of rural and urban communities along the route.

Planning versus Unrestricted Development

In his study of the Niagara Peninsula, Professor Ralph Krueger of Waterloo University demonstrated that if the present pattern of urban sprawl continues at a constantly increasing rate, the fruit-growing industry in this area will cease to exist by about 1980. Approaching the problem from the standpoint of what might be achieved through proper planning, on the other hand, and assuming an increase of a million urban dwellers in the area over the next 40 years, Professor Krueger arrived at the startling conclusion that there is ample land available in the Niagara Peninsula to support the fruit-growing industry and to provide for the important and inevitable urban expansion. The province-wide implications of his findings with respect to the future needs of land for agriculture are obvious.

WATER RESOURCES AND LAND USE

Adequate water is vital to the urban dweller, to industry, to agriculture and to recreation. It is usually the resource most squandered. In spite of the fact that 12% of the surface area of Ontario is water, this resource is in short supply in many areas. To make matters worse, hardly any stream in southern Ontario is not polluted. As water demands by the year 2000 will probably be at least treble those of today, our growth will be hampered if we do not plan adequate supplies for the future. This includes provision for an effective programme of pollution abatement and control.

Water and Urban Development

Urban and industrial development takes place where water is available. Thus the provision of water to an area is a major factor in influencing its land use. Conversely it provides a tool available to planning authorities for directing development to desired areas.

Water for Agriculture

The needs of water for crop irrigation alone by 1975 will exceed all other uses of water during the peak period of water demand. While approximately 70,000 acres of crop land in Ontario are under irrigation at the present time, it is estimated that by 1975 this area will have increased to one half million acres using over 2 billion gallons a day.

Already in some places there is serious competition for the use of existing supplies of water for irrigation between one farmer and another, and between farmers and other users of water. At present any legal decision involving a dispute over water use would be settled on the basis of riparian doctrine

derived from English common law. As it is physically impossible for a farmer who draws water from a stream for irrigation to return it to the stream undiminished in quantity, the Conservation Council has recommended to the Ontario Water Resources Commission that a new water law be drawn up, applicable specifically to Ontario conditions, and that subject to certain exemptions this law be based on the doctrine of public right vesting ownership of water in the Crown.

Wetlands

Wetlands play an important role in maintaining the watertable and as habitat for wildlife. Properly drained, certain of them can provide soils for special crops. As we do not yet know enough about our wetlands or how they should be handled, the Council has urged the Government of Ontario to set up an annual budget for research into wetlands to determine the best use and management of these important areas.

Planning for Future Needs

In order to plan for future needs it is necessary to gather much more information than is at present available. We need to know our total water availability from both existing and potential sources as well as our total water requirements in detail now and projected into the fairly distant future—1980-2000—town by town, even farm by farm. Without such information, decisions regarding water development will remain intolerably inexact and tentative.

Problems of water pollution and supply are intensifying almost day by day. It is vital, therefore, to obtain this information while there is still a chance to get ahead and stay ahead of water demand. In the United States concern is being expressed that they may already be too late to ensure adequate water for all purposes for the future.

The Conservation Council is of the opinion that the Government of Canada should immediately set up machinery to assist the provinces in carrying out the elaborate studies and surveys that are needed so urgently and to do whatever else is required in co-operation with the provinces to ensure supplies of water of sufficient quantity and quality for all purposes in the foreseeable future.

FORESTRY AND LAND USE

Ontario's forests cover 65% of the total area of the Province. There is virtually no competition for the use of this land and it is estimated that there is enough to supply both the present and foreseeable needs of pulp, lumber, and veneer.

Where land in southern Ontario is suited to the production of forest crops, and where labour and capital thus employed find adequate returns commercial forestry should be encouraged. The social benefits of forest cover provided by recreational facilities, wildlife habitat and restraint of water run-off may thus be realized as well as the economic returns. Many areas of depressed agricultural development may well fall within this classification.

With increasing population and leisure, the recreational and wild-life values of southern forests will increase and in places will surpass the value of wood production from the forest. Considering the high land values which prevail in this agricultural region, the establishment of forests requires the supply of low-cost capital, forest crop insurance at reasonable prices, and expanded extension and marketing services to the private owner.

On the Crown owned forest land, most of which is in northern Ontario, the building of roads to permit the harvesting of the presently inaccessible timber most effectively, giving priority to mature or damaged trees, is the first step to better land use in those areas.

RECREATIONAL REQUIREMENTS AND LAND USE

If Ontario is to prosper in the future it is not sufficient for the Province to be merely a place where a family can exist: it has to be a good place in which to live and bring up a family. This is intimately tied to recreational facilities.

At present, southern Ontario lacks recreational facilities in the form of parks, except in the Ottawa, St. Lawrence and Niagara Falls areas, to an extent unparalleled by any other major population centre in North America.

Apart from urban parks which are not considered in this brief, outdoor recreational facilities fall into two main types:

- (1) wilderness
- (2) rural and near urban.

The wilderness parks in Ontario such as Algonquin, Quetico, Lake Superior and Sibley, are normally found in the areas of Crown lands where they present few serious land use conflicts. The Department of Lands and Forests is able to plan for the future, and does with some freedom. However evidence of overcrowding in some of these existing parks suggests the wisdom of earmarking additional suitable areas for similar purposes.

The critical problem, however, relates to parks for southern Ontario, which are classified above as rural or near urban. It is in this area that action and planning are urgently needed.

It is estimated by planners that there should be a minimum of 10 acres of readily accessible (under 50 miles) park for each 1,000 population. At present Ontario has a population of 6,040,000 and population estimates for the year 2000 are 12,534,000. This, however, is only part of the story since the main increase will be in southern Ontario.

Obviously the most critical area is, and will remain, that from Oshawa to Niagara Falls. Based on the present population of this area 42,000 acres of rural parks are deemed necessary. By the year 2000 this should increase to 96,000 acres. At present the total is about 5,000 acres. This compares with 60,000 acres for the Chicago area, 15,000 acres for Detroit.

It is estimated that the total additional amount of land required for park purposes in southern Ontario by the end of the century will be approximately 200,000 acres, a large part of which is at present privately owned.

In the view of the Conservation Council, a major crisis in outdoor recreation in southern Ontario will occur in the not too distant future unless bold constructive measures are taken soon to acquire or set aside in some way the lands which are needed now and which will be needed in the future.

Some of the factors on which this conclusion is based are:

Failure to realize that greater real income, greater leisure time, and greater mobility when added to population increase mean a greater demand for recreational land use than we are planning for.

Failure to recognize that lands suitable for recreation within a 50-mile radius of the large urban concentrations of southern Ontario are strictly limited.

Failure to appreciate that these lands are rapidly being alienated for other purposes and that the cost is continually rising.

Failure to recognize that much of the land that will be needed for park purposes in southern Ontario by the end of the century should be acquired NOW.

Insufficient funds to embark on the required large-scale acquisition programme.

The simple geographical fact that the great concentrations of urban people sprawl out for the recreational use of land into areas where they have no political power or influence.

In the opinion of the Conservation Council, the first step in dealing with the recreational land use problem is for the Government of Ontario to initiate at once a province-wide survey of all outdoor recreational facilities in the light of both our immediate and long-term needs. Such a survey should consider the changed pattern of age distribution of our people as well as their geographical distribution to make certain that outdoor recreation in the future will always be available to all segments of the population. Due regard also should be given to the problem which has resulted from the rapid disappearance of open land in southern Ontario suitable for provincial and local parks and other recreational purposes. The survey should include recommendations for appropriate action.

Quoting from a report dated February 1st, 1960, on the Outdoor Recreational Survey conducted by the Conservation Department of the State of New York:

The most important single finding of our survey is the immediate and compelling need to acquire additional lands for park and other recreational purposes before they are lost forever.

There is no precedent in this State for a program of such magnitude. A vast sum, \$75,000,000, must be raised and the funds made available for immediate use. Since appropriations from regular state funds cannot possibly meet the need, new and imaginative legislation authorizing a bond issue to be retired by revenue from recreational facilities, is required.

Perhaps a method similar to that advocated by the State of New York and since adopted, would be feasible for the large-scale acquisition of park land which will be required for the optimum development of southern Ontario.

RESOLVING LAND COMPETITION

Land competition occurs when two or more interests require the same piece of land for conflicting purposes.

With an expanding economy land competition is bound to occur. Some of it is inevitable but a great deal is induced, much of it by government action.

The factors which fall in the latter category and induce a new land use pattern include the following:

- (a) The opening of new highways.
- (b) The provision of services to an area, e.g. water, power, gas, etc.
- (c) A changed tax structure.

Where, therefore, it is undesirable in the long term interest of the Province's economy to see a change in a land use pattern, governments (whether provincial, municipal or at any other level) should weigh carefully their plans before taking action which is bound to induce a changed pattern. The converse is equally true. Good planning can steer development onto lands which are contributing little under their present land use. This might be described as the positive approach.

The question of whether a land owner can do what he wants with his property is a very basic one. The city dweller already accepts certain zoning laws. In fact what he can do is strictly controlled. The rural land owner also accepts some controls but revolts at the thought that anyone, other than himself, should be the judge of whether or not he may sell his property for a changed land use, e.g. from agriculture to subdivision for urban purposes.

We control our forests and insist that they be cut on a sustained yield basis. This is because our forests are not limitless and we are concerned to protect our long term interests, even if we could make larger earnings for

a few years in the forest industries by indiscriminate felling. However, we do little to protect the 12,000,000 acres of good soils, which are all that we have in Ontario.

It is very seldom that any development requiring the use of existing agricultural land is faced with a single choice of site. Currently there is no machinery to ensure that the development is directed onto the area most beneficial to the total land use, nor do the facts always exist which would enable such a decision to be taken even if the machinery were available.

We believe, based on the trends developing in Canada and in other lands, and in the light of the anticipated land demands of the future, that it is only a matter of time before land use will be controlled at the provincial level. However, rigid controls appear premature at this time. It would seem that an approach which safeguarded the major portion of our prime soils for the future should suffice for at least the next 20 years.

As explained in earlier sections, there is a close relationship between land use and taxation. The wrong tax structure can quickly force land from its optimum land use into another purpose which can support the immediate tax load.

The land requirements for recreation are such that their fulfilling requires no special new machinery. All that is needed is the determination by the Government to select and purchase or reserve the land required while it is still available.

The compilation of the necessary data to enable planning authorities at all levels to make sensible land use decisions is not a large task using modern methods. It could probably be done for the whole of southern Ontario in four years at an acceptable cost. Such data must include soil surveys and existing land use maps. From these, land capability maps can be compiled.

In conclusion, and in very broad and simple terms, we believe that a solution to land competition might be found in the following manner:

- (a) By compiling the necessary survey data and establishing the optimum land use.
- (b) On a positive basis by planning public works, particularly highways, in such a manner that the land use pattern is least disrupted and even improved by directing development into desired areas. This would necessitate consultation among the Departments of Highways, Agriculture, Lands and Forests, Planning and Development, and Municipal Affairs.
- (c) By arranging for the establishment of Regional Planning Boards; by establishing uniform assessment procedures in each Region; and by collecting centrally all taxes in each Region for redistribution to municipalities on an equitable formula basis, such that industrial and residential development could be concentrated economically in a properly planned way.
- (d) By ensuring that the Department of Municipal Affairs uses its authority under the Planning Acts to classify land as follows:
 - (i) Class A—Prime agricultural land, which cannot be sold for non-agricultural purposes without reclassification into Class B which would require the approval of the Departments of Municipal Affairs and Agriculture.
 - (ii) Class B—Second grade agricultural lands, or prime agricultural lands which for some reason (e.g. adjacent to cities) had been reclassified. These lands could be changed to Class C at the discretion of the owner at any time but could not be resold for non-agricultural purposes unless this were done. Reclassification to Class C would be permanent.
 - (iii) Class C—All other lands including urban, suburban and rural awaiting development.

- (e) By passing legislation at the Provincial level under which Class A and B lands were assessed and paid taxes on a rural basis, whether or not they lay within the area of a Regional Planning Board or were adjacent to urban development.

The above system would permit land owners to plan their agriculture on the Class A soils on a long term basis with the assurance that taxes would remain at acceptable levels. It would permit Class A and B lands to continue in farm production right up to the urban perimeters. It would protect the major part of our valuable soils for the future with the minimum of controls. It would permit better urban planning. Finally, while not eliminating all land competition, it would result in this competition being confined largely to those lands whose changed use would be least harmful.

CONCLUSION:

After many months of intensive study and research into problems of land use, the Conservation Council of Ontario has recommended:

- (a) THAT THE GOVERNMENT OF ONTARIO TAKE STEPS IMMEDIATELY TO CREATE A LAND USE PLAN FOR THE PROVINCE AS AN EXPRESSION OF OVER-ALL PUBLIC POLICY.
- (b) That in order to formulate the above mentioned policy, a council with senior representation from each department of the Government concerned with land use planning be appointed, together with a full time chairman; that the chairman of this council be given authority to require the making of all necessary surveys, studies, and plans (where incomplete), such surveys to include existing land use maps, land capability surveys, soil surveys, wetland surveys, and other data; that the necessary permanent administrative machinery be established to implement the plan.
- (c) That the public policy concerning the use of our land and our natural resources be based on what we have, how we are now using it, and how we can best use our land and resources for the future well-being of the people.

Respectfully submitted on behalf of
The Conservation Council of Ontario.

The ACTING CHAIRMAN: Before we open the discussion, Mr. Henderson, I wonder if you would be good enough to tell us briefly about the origin of your Council, and indicate the degree of success you have had in working with the various organizations and also your success in presenting your ideas to the government of Ontario and to other interested persons. I presume your organization deals directly with the government.

Mr. HENDERSON: Yes. The formation of the Council arose out of an idea that occurred to Mr. Frank Kortright, the president, who is a well-known conservationist and naturalist. He has written a classic work of reference on wild fowl and he arrived at the conclusion, which others had arrived at before him, that it is not feasible to deal with resources, to deal with wild life and fish conservation, without considering other forms of conservation, because the success of wild life conservation must depend upon the land and the success of fish conservation depends equally upon your water resources. You cannot have a good crop of wild life on poor land nor can you have a good crop of fish in poor waters. He thought a broad representation of all resource interests would be a big step in the right direction and in 1952, with one or two other people in the province who were interested in the same objective, he discussed the subject at a preliminary meeting

at the Agricultural College at Guelph, and the idea was acceptable. It was made plain that none of the member organizations that joined the council would lose their identity or their autonomy in any way. That was the beginning of this movement. Each of these organizations appoints two members to the Council and they have equal voting rights. They are directors of the Conservation Council. We study problems objectively. We have various groups—agricultural and forestry groups, and so on—who, while they are interested in furthering their own particular aims, are also interested in the Council itself and wish to promote the total conservation picture. In other words, they are interested in the best use of our resources in the overall picture. We have studied various problems—soil, water, forestry, fish and wild life—and in each case have published a report similar to this land use report.

These reports are presented to the Ontario government and they are also given wide distribution to the public. I think we have had fair success in having some of our recommendations implemented, and I might mention here the soil and water report. About half the recommendations we made have been implemented in that direction and a good many in forestry, fish and wild life. The present report is of course new and we shall not know for some time what has happened.

We enjoy very good relations with the Ontario government. We are not a pressure group but prefer to consider ourselves an advisory body. The Minister of Lands and Forests and the former Minister of Agriculture have attended our meetings with their staff to discuss problems. I am myself a member of the advisory committee to the Minister of Lands and Forests. In educational work, a large part of our work consists in educating the public.

After all, governments can do only what is politically feasible. Perhaps they would like to do certain things but they find that the public is not ready to accept those things and so we try to inform the public and educate them into the acceptance of what should be done, and we ask the Government to do these things.

One case in point is the bounty system in Ontario in the attempt to cope with the problem in regard to wolves. The Government has paid some \$50,000 in bounties and that has been proved by biologists to be a waste of money. It does not solve the wolf problem. The Government has not been able to eliminate the problem because the public has not been ready to accept the solution, but that will come about, and the bounty system will eventually be given up as it has been in other provinces and in the States. As I said before, we are financed by an annual grant from the Canadian National Sportsmen's Show which is held in the Coliseum in the C.N.E. grounds in Toronto each year and for the last three or four years they have been making an annual net profit of \$100,000 from that neighbourhood. All that money goes towards conservation. Frank Kortright originated that Sportsmen's Show for the express purpose of raising money to finance the council and other organizations and a considerable part of the proceeds is devoted to research projects in universities throughout Canada—not just in Ontario. Recently Mr. Kortright announced that since the show was formed in 1948 about \$1 million has been raised and distributed for projects of one kind or another.

THE ACTING CHAIRMAN: Do any of these organizations, members of your group, contribute anything—or departments of agriculture?

MR. HENDERSON: No. Originally we left it to any of them if they wanted to give us an annual fee or sustaining membership fee, but we did not insist that they should, because some of them are not in very good financial shape and it was not reasonable or fair or feasible to levy an annual fee. As a matter of fact, we sometimes do receive a membership fee that has not been asked for. That is not what we depend on.

The ACTING CHAIRMAN: You do not get any grants from the Government?

Mr. HENDERSON: No, we do not want to.

The ACTING CHAIRMAN: There are some important organizations listed here such as the Agricultural Institute of Canada, the Ontario Federation of Agriculture, the Town Planning Institute of Canada and so on.

Mr. HENDERSON: I think our membership includes the major organizations in Ontario that are interested in resource management in one form or another.

The ACTING CHAIRMAN: I think, gentlemen, this brief we have heard this morning from the Conservation Council of Canada points up the absolute necessity of completing the soil survey of the country. That was the first recommendation from the Land Use Committee to the Government. This brief shows how necessary it is. Are there any questions? First of all, I should have asked Mr. Henderson in the first instance to give us his background and his activities in relation to this work.

Mr. HENDERSON: My personal background? I am a graduate of an agricultural college in England comparable to the Ontario College of Agriculture. I have always been interested in conservation and am a keen naturalist and sportsman. I have a background in agricultural training.

Senator HIGGINS: What effect has the seaway had on the fruit belt in the Niagara Peninsula?

Mr. HENDERSON: I think it will stimulate industrial development. There is no question that the port of Hamilton will do more business than the port of Toronto, and of course increased activity through the Welland Canal is bound to encourage industrial and urban development in the area.

Senator HIGGINS: That is not what I had in mind. What I am interested to find out is whether the Seaway has destroyed the fruit belt, or to what extent it has affected it. We have always understood that the fruit belt was essential to Canada and I wanted to find out—if it is at all possible to find out—to what extent it has been destroyed by operations in connection with the seaway. Is there any possibility of getting any other land comparable to the fruit belt.

Mr. HENDERSON: I am afraid I cannot say how much has been destroyed as a result of seaway operations. That area, as has been pointed out by Professor Krueger, who has made an intensive study of the Niagara Peninsula, is a unique combination of climate and soil and is well suited for peach growing. It may be possible to grow peaches in Essex and Kent counties, but the climate there is not so favourable as it is in the Niagara Peninsula. There are more frost-free days in the Niagara Peninsula than there are elsewhere and that is essential at the peach blossom stage.

Senator BARBOUR: The land taken for seaway purposes would be very little in comparison with the land taken for business sites and building.

Mr. HENDERSON: We are not worried about the amount of land taken by the seaway or by industry or by housing, or the amount of land that would be needed. The trouble, from our point of view, is lack of planning, going all over the area. As uncontrolled urban development takes place in a farming community it sterilizes a lot of the land around it.

Senator GOLDING: When Professor Krueger appeared before our Committee he submitted an excellent brief.

Mr. HENDERSON: Yes, and that is why we have not gone into the subject in greater detail.

The ACTING CHAIRMAN: He indicated that there are certain areas that are now used for fruit growing that might well come out of the fruit belt and be used for other purposes.

Mr. HENDERSON: Near Hamilton and St. Catharines it is inevitable that some of the land will be taken over, but if the peninsula as a whole is properly planned there will still be enough.

Senator GOLDING: I thought he made a very fine submission to the Committee.

Mr. HENDERSON: Yes, he has made a comprehensive and thorough study of the whole situation.

The ACTING CHAIRMAN: I might ask Mr. Henderson this question. In your experience with the Council, Mr. Henderson, have you reason to believe that people are being educated to the point where they will be willing to submit to certain areas of control in relation to land use? I am thinking in terms of my own province. We have a provincial planning commission, town planning commissions and county planning commissions and they are going into the rural areas. We have had some difficulties and as a matter of fact there have been a few lawsuits in consequence of some people going in and doing certain things in a particular area which were against the regulations of the planning commissions. Recently, however, even in the far distant country, we are beginning to recognize the need of something like this and there is not very much criticism. Do you think we are approaching the time when some regulatory legislation will be introduced into some of these fields? I am particularly interested in this subject and this may be because of my love of the soil, but it breaks my heart to see good agricultural land used for other purposes. If we continue to use our best farming lands for other purposes I do not know what will happen to agriculture.

Some years ago I was in western Canada and when I came back home I suggested that we were trying to farm on areas we should not farm at all and I thought a lot of this land could go to other uses. But we must conserve our best farming lands or we shall find ourselves thrown out on the road, so to speak. My thought is that by legislation, not on the part of any one government, but by a combination of federal and provincial laws, people might be made aware of the situation and might come to accept certain areas of control.

Senator SMITH (*Kamloops*): As the members of this Committee will recall we had a very valuable discussion headed by Professor Krueger and he had a great deal of information in detail which he gave to the Committee. I am wondering how much of what he disclosed to us could be related to this formula of recreational areas on the basis of so many acres to 1,000 of population—ten acres to 1,000 of population, I believe, is the proportion. With that formula there is a suggestion that it should be within fifty miles for accessibility of population. Relating that to the twelve million acres of prime land and the twenty million acres now being farmed south of the pre-Cambrian shield, is there any information available now that would permit of the adoption of a plan in accumulating this desirable recreational area with the least possible intrusion upon the twelve million acres of prime land. If this whole programme is worthwhile it is important that it should be got under way because, with the rapid change in land use, ownership, and so on, it will become more expensive and difficult from year to year the longer the programme is delayed. Could Mr. Henderson throw some light on that—the relationship of desirable recreational area to the twelve million acres of choice land.

Mr. HENDERSON: Fortunately, there is very little competition between good agricultural land and land suitable for recreation. The best agricultural land is fairly level and there are not too many trees, and it is not the sort of land suitable for recreation. We are thinking primarily in southern Ontario of the Niagara escarpment which runs from Niagara to the foot of Bruce

Peninsula. That is one recreational area. It is very heavily wooded, very scenic and is easily reached from many of the large centers of population. Northwest of Toronto, between Hamilton and St. Catharines, the land is not too expensive right now but it is becoming more costly. Most of the competition with recreational land comes from people who want to develop private estates. I do not know whether you know the Port Credit region. It is quite scenic and it is being rapidly bought up by wealthy people who are turning it into big estates. The result is that the cost has jumped tremendously in the last few years, from \$100 an acre to \$700 in some places.

Senator BARBOUR: It is hard to keep that as farm land.

Mr. HENDERSON: It is hilly and rugged.

Senator SMITH (*Kamloops*): That would not be in the twelve million acres of choice land?

Mr. HENDERSON: No.

Senator BARBOUR: When the city of Charlottetown was surveyed they left a space for the waterfront, the main streets were wide—they are today—and there were four parks left in the lower part of the city, just a square. In one of these four parks there are the market square, the law courts, the provincial building and the Anglican church, and then there was land set aside for Government House, and there were forty acres for a park. That is the foresight they showed many years ago; then when people commenced to build after that they went everywhere; there were narrow streets and there was no planning. Now, they are planning wider streets.

Mr. HENDERSON: That happens in many places.

The ACTING CHAIRMAN: The old people "built better than they knew".

On page 3, under the heading "Soils and Land Use", there appears this statement: "Likewise, the farmer must be able to earn a living comparable to that of his city neighbour." I wonder if that desirable objective will ever be reached. I do not know how many farmers would qualify.

Mr. HENDERSON: It would be desirable if it did happen.

Senator STAMBAUGH: It is at least a good target to shoot at.

The ACTING CHAIRMAN: Senator Stambaugh, have you in Alberta a council similar to this?

Senator STAMBAUGH: Yes, we have a provincial planning board and there is a planning board in each of the two principal cities. They are similar to the Ontario Planning Board. We have also an association the purpose of which is chiefly for the preservation of wild life, along the lines suggested here, but we have no conservation association such as is described here.

Mr. HENDERSON: I do not think there is any organization quite comparable to ours in North America.

Senator STAMBAUGH: I have never heard of one.

Mr. HENDERSON: It is unique.

The ACTING CHAIRMAN: It is unfortunate that we have not got one in every province.

Mr. HENDERSON: We are suggesting that for tomorrow's conference and we hope that something like that will come about. We are fortunate in having the Sportsmen's Show to support us.

The ACTING CHAIRMAN: You have referred to taxation. Do I understand you to say that in the rural area or parish or county, rural taxation should be the same throughout?

Mr. HENDERSON: For agriculture, yes. We feel that agricultural land within the taxation authority, no matter where located, should be assessed

on an equal basis so that farmers would not be forced to sell their farms. Around the urban developments in southern Ontario many farmers are forced out of farming because of high taxation. Once the city spreads out they are assessed on an urban basis and cannot keep on farming on that basis.

Senator STAMBAUGH: You do not mean that it would be so many dollars per acre throughout the area, on each acre wherever situated.

Mr. HENDERSON: Yes, within the regional planning board. If planning is carried out on a regional instead of a municipal basis all land that is being farmed would be assessed equally; but once it is classified into class "C" lands, which means that it is ready for development, the new assessment applies. In other words, if the owner wants to sell the land for development he will pay the new assessment, but if a farmer wants to continue farming he should not be penalized by confiscatory taxes.

The ACTING CHAIRMAN: I am afraid we would run into a lot of difficulty there because in our province we have county units for taxation—that is, outside of towns. We have the county unit and everything goes in with certain exceptions. Everyone is taxed the same, but the assessments are vastly different. To illustrate what I mean, if you will pardon a personal reference, my farm was twenty miles from Moncton. It was not on No. 2 Highway between Saint John and Moncton. I was forced to sell the farm, much as I disliked doing so. I could have sold the farm for twice what it brought had it been on No. 2 Highway. It was not a large farm, about 200 acres, but someone living 7 or 8 miles from Moncton sold his farm for twice what I received for mine, though I would not give my farm for two of his. But he was nearer the city, a comparatively short time away from the market. Our assessment is based on several things; there is a certain assessment on the type of business and a certain assessment that has regard to a certain road.

Senator SMITH (*Kamloops*): What you are telling us is that the assessment system has been a reflection of the potential value for development along other lines than agriculture.

The ACTING CHAIRMAN: It is a combination of things.

Mr. HENDERSON: Perhaps I did not make myself clear. What I meant to say was that agricultural land close to the city should not suddenly be assessed the same as land in the city—in other words, for its potential use. The assessor will now assess agricultural land on the borders of the city for its potential value for development and will not take into consideration its purely agricultural use and a farmer who wishes to continue farming will be forced to sell because of the tremendous taxes levied. It is not realistic to assess all lands equally on a rural as on an urban basis.

The ACTING CHAIRMAN: I am glad that is cleared up.

Senator HIGGINS: Would you include small ponds as wetlands?

Mr. HENDERSON: I think the definition contemplated in this context means not actually ponds which have water to any depth but marsh lands which are sometimes flooded and sometimes partly dry, and bogs and swamps—not actual lakes or ponds.

Senator HIGGINS: Is it the policy of the Council to preserve all these small ponds?

Mr. HENDERSON: There are some swamps that have a value for agriculture, though not all of them. Holland Marsh, north of Toronto, has developed into a tremendous market garden area, but we do not know enough about these areas to say whether this one or that one is suitable for draining. Several

have been drained in the province and they were found to be absolutely un-economic and should never have been drained. They should have been left for wild fowl. The duck population is declining largely because of the gradual loss of suitable habitat.

Senator HIGGINS: The drying up of marsh lands in Saskatchewan and Alberta resulted in the destruction of a lot of ducks. Is there any intention of keeping these marsh lands for wild life?

Mr. HENDERSON: Most of them are in private ownership and it is up to the individual who owns the land to decide what he wishes to do with it.

Senator HIGGINS: Is it a good policy to keep a lot of that land in the hands of Government?

Mr. HENDERSON: Where it has not an obvious value for agriculture. Where there is a big marsh that has potential value for agriculture, that should be the best use to which it is put; otherwise it has a value for maintaining the ground water table and wild life, which is a valuable recreational resource.

Senator STAMBAUGH: In Alberta, in the Peace River district, there were seven or eight sections known as the Kleskin Marsh. People in the district thought it would be wonderful to have a farm land company take it over and drain it, but it was discovered that it was not good land anyway. An association known as Ducks Unlimited, a group of sportsmen, dammed it up again and it is now a wild life conservation area. It should have been left that way in the first place.

Senator HIGGINS: Would you consider, Mr. Henderson, that rivers should be for the public use and not private use—in other words, that riparian rights should be wiped out.

Mr. HENDERSON: Our reference is to the present laws governing the use of water under the riparian doctrine. They are not workable because under the terms of that doctrine water drawn from a stream or a river for any purpose has to be returned in the same amount and in the same quality. That may have been workable in the old days before irrigation came into such prominence, but obviously you cannot draw water for irrigation and return it. There have been cases in Ontario where a farmer upstream would pump a stream dry in the summer so that the farmer downstream would have no water for his cattle. Four years ago there was a bad drought and there were instances of something like violence, almost, some farmers threatening to shoot others.

Senator HIGGINS: We have no riparian rights in Newfoundland. The settlers who came brought the common law with them and by common law there would be riparian rights; but the government at the very beginning, when they decided to grant Crown lands, reserved for public use 60 feet or 40 feet, as the case might be, and that prevented riparian rights on all rivers.

Mr. HENDERSON: That is interesting.

The ACTING CHAIRMAN: Are there any more questions?

Senator GOLDING: Mr. Chairman, I would move that we express the thanks of this Committee to Mr. Henderson for the excellent brief he has given us today and which has given rise to an interesting discussion.

The ACTING CHAIRMAN: May I add my word of appreciation. I can assure you, Mr. Henderson, we are all interested in the work of your Council and as long as this Committee is in existence we shall be glad to have any further information you can pass on. Before the meeting closes there is one question

I would ask you. On page 14 of your brief you refer to the passing of legislation at the provincial level. Do you mean by that legislation that will be correlated with or that will tie into federal legislation in relation to land use and in the carrying out of the classification of soils?

Mr. HENDERSON: We were not considering that. We did not have it in mind but it would be a good idea.

The ACTING CHAIRMAN: From your experience with people, do you think we are pretty nearly ready for something of that nature?

Mr. HENDERSON: Yes. There is a tremendous amount of interest but there is a great area of disagreement.

Senator BARBOUR: It is difficult to get different political parties to line up.

Mr. HENDERSON: You have put your finger on it. There is a large area of disagreement and it is difficult to get action, but interest is growing all the time.

Senator STAMBAUGH: If you are going to tie in with the preservation of migratory fowls you have to work along with the federal government.

Mr. HENDERSON: Yes, it is a federal responsibility. I wish to thank you, Mr. Chairman and Honourable Senators for your courtesy and I assure you I appreciate the opportunity of presenting this brief to you.

The committee adjourned.

JAN 2 - 1963



Fourth Session—Twenty-fourth Parliament
1960-61

THE SENATE OF CANADA

PROCEEDINGS OF

THE SPECIAL COMMITTEE OF THE SENATE

ON

LAND USE IN CANADA

No. 2

WEDNESDAY, FEBRUARY 15, 1961
THURSDAY, FEBRUARY 16, 1961

The Honourable Arthur M. Pearson, Chairman
The Honourable Henri C. Bois, Deputy Chairman

WITNESSES:

- Mr. A. D. Crerar, Research Planner, Lower Mainland Regional Planning Board.
- Dr. P. C. Stobbe, Director, Soil Research Institute; and Dr. P. O. Ripley, Director, (Soils) Research Branch, both of the Canadian Department of Agriculture.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Golding	Molson
Basha	Higgins	Pearson
Bois	Horner	Power
Boucher	Inman	Smith (<i>Kamloops</i>)
Bradette	Leger	Stambaugh
Buchanan	Leonard	Taylor (<i>Norfolk</i>)
Cameron	MacDonald	Taylor (<i>Westmorland</i>)
Crerar	McDonald	Turgeon
Emerson	McGrand	Vaillancourt
Gladstone	Méthot	Wall
		White—31.

(Quorum 5)

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

"The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Bois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—

Resolved in the affirmative."

J. F. MacNEILL,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

WEDNESDAY, February 15, 1961.

Pursuant to adjournment and notice the Special Committee of the Senate on Land Use in Canada, met this day at 8:00 p.m.

Present: The Honourable Senators: Pearson, *Chairman*; Basha, Gladstone, Higgins, Inman, McDonald, McGrand, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), and Turgeon.

In attendance: The Official Reporters of the Senate.

Mr. A. D. Crerar, Research Planner, Lower Mainland Regional Planning Board, British Columbia, presented a brief, was heard and questioned.

The Honourable Senator Taylor (*Westmorland*) informed the Committee that there had been several discrepancies in the original copy of the printed proceedings of the Committee of Thursday, February 2nd, 1961, and that there had been only a limited distribution of the said proceedings and that a revised copy had received general distribution.

At 9:30 p.m. the Committee adjourned until tomorrow, Thursday, February 16th, 1961, at 11:00 a.m.

THURSDAY, February 16th, 1961.

At 11:00 a.m. the Committee resumed.

Present: The Honourable Senators: Pearson, *Chairman*; Barbour, Basha, Boucher, Gladstone, Golding, Higgins, Inman, McGrand, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*) and Turgeon.

In attendance: Mr. Ralph A. Stutt, Special Consultant to the Committee, and the Official Reporters of the Senate.

The following Officials from the Canadian Department of Agriculture, presented briefs, were heard and questioned:—

Dr. P. O. Ripley, Director (Soils) Research Branch, and Dr. P. C. Stobbe, Soil Research Institute.

At 12:45 p.m. the Committee adjourned to the call of the Chairman, tentatively set for Thursday, February 23rd, 1961, at 11:00 a.m.

Attest.

James D. MacDonald,
Clerk of the Committee.

THE SENATE
SPECIAL COMMITTEE ON LAND USE IN CANADA
EVIDENCE

OTTAWA, Wednesday, February 15, 1961.

The Special Committee on land use in Canada met this day at 8 p.m.

Senator ARTHUR M. PEARSON in the Chair.

The CHAIRMAN: It is 8 o'clock, honourable senators, and I see that we have a quorum. Appearing before our committee tonight is Mr. A. D. Crerar, Research Planner for the Lower Mainland Regional Planning Board. He is from New Westminster, British Columbia. He will be talking on urban sprawl primarily.

We will now hear from Mr. Crerar.

A. D. Crerar, Research Planner, Lower Mainland Regional Planning Board of British Columbia: Mr. Chairman and honourable senators may I give a brief outline of my position and work.

I am research planner with the Lower Mainland Regional Planning Board. The Lower Mainland Regional Planning Board is one established by the Government of the province of British Columbia, having jurisdiction over the whole of the mainland, that is the area from the gulf to Hope. It includes the city of Vancouver and 27 other municipalities. It is provincially established and partially provincially supported but primarily it is a municipal organization. I have been with the Board for ten years and during that time we have studied this matter of land use and in particular the sprawl situation in the lower mainland in great detail.

In 1956 we prepared a report—I was the one in charge of that—on the economic aspects of urban sprawl. We were examining the problem of loose scattered development of the regions from the point of view of just how much it had cost the municipality to have this kind of development, and we came up with certain findings which I will mention in passing over my brief tonight.

Since then we have carried on work in this particular field. A number of items which I introduced into this brief I have been working on for the last two years, where we did a considerable amount of investigation into the land and land market, and another brief which I prepared for "Resources for Tomorrow" which examines the losses of agricultural land in the growth of the major cities in Canada. It is a brief which I prepared for the "Resources for Tomorrow" conference which I again make use of here.

So, in addition to the material which we submitted earlier to your committee, we have carried on our work in this particular line, and I am, as it were, bringing you up to date on some of our more important findings and trying to give you a consolidated brief.

That, Mr. Chairman and honourable senators, will give you an idea of my background and qualifications, as it were.

LAND USE IN THE METROPOLITAN REGIONS OF CANADA

The area of concern of this brief is the metropolitan region. By this I mean the whole of the area physically affected by the growth and development of our great cities. The examination will be considered in three parts:

1. The character and nature of land use in metropolitan regions, with particular emphasis on the frontier between the city and agricultural areas.
2. The reasons for this pattern and some speculation on the future.
3. Suggestions for tackling the problem.

I. *Character:*

Metropolitan regions can be separated into three broad land use categories, the compact, built-up, urban areas, farm land and the transition area between these two. By my definition the metropolitan region extends outward from the city core to the point where no further loss of farmland occurs.

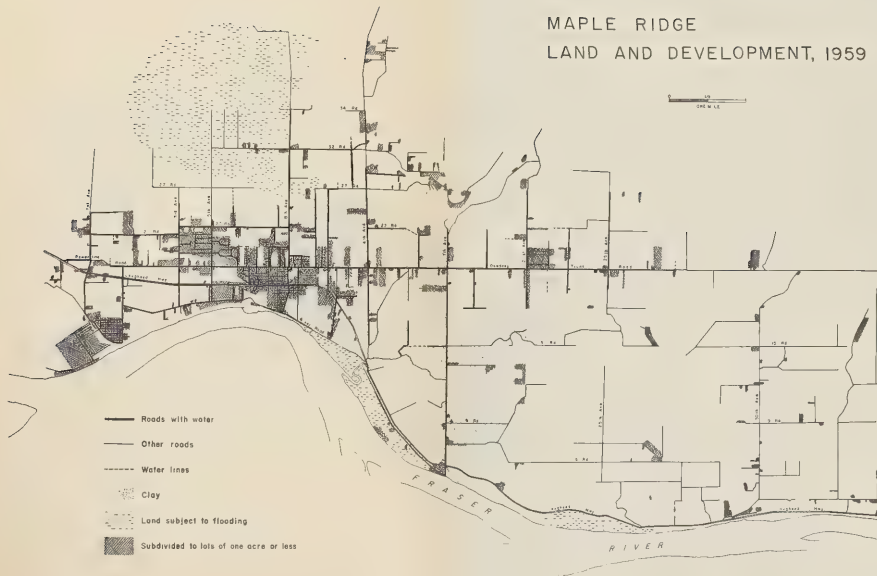
In other words the metropolitan region is the whole area which is physically affected by the growth of our cities. There are all sorts of things which determine a metropolitan region. You speak of big cities, Vancouver for example, having an influence half way across the Prairies as a grain shipping centre; the distribution of newspapers, which are distributed from cities, often extend the influence of that city out some distance, but what I am speaking of here is the actual physical effects on a city which I would say is recorded by the loss of farm land, and I go into the reason for choosing this particular method of drawing a boundary around a metropolitan region in my brief for the "Resources for Tomorrow" conference. I have reproduced in this brief a map from that, which is map No. 1.

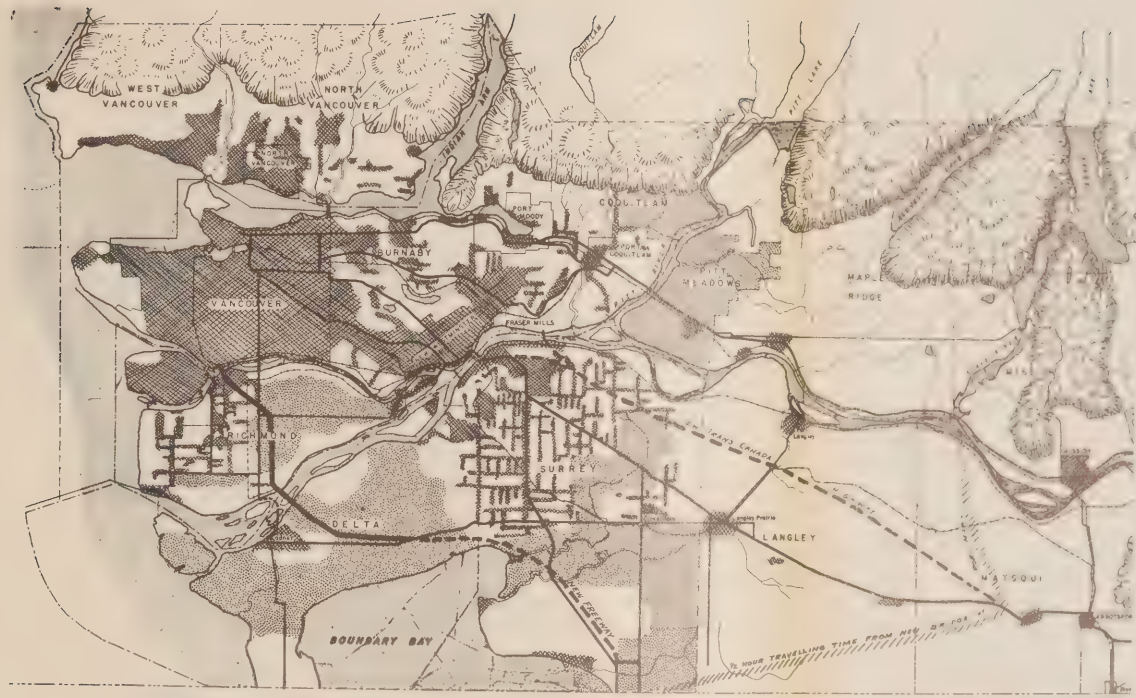
Now, as such, these areas which are influenced by metropolitan development cover huge areas. For example, look at the complex Toronto-Hamilton area, on map No. 1. In other words, I looked at every township out from Toronto and every township out from Hamilton and I found it was a continuous belt of loss of farm land between these two places. Taking the census for 1951 and the census for 1956 we find there was farm land loss all throughout that whole area which is stippled on map No. 1. The Toronto area, for example, covered 1,546,000 acres, in 1956. Now, this brief will not concern itself with land use in the built-up sections of the city or with farm land beyond the zone of influence of the metropolis, but with the uses in the transition zone where the transfer from agricultural to urban use occurs.

The principal use in this area, other than the remaining agricultural lands, is urban sprawl. Urban sprawl is housing, or the subdivision of land for housing, that is urban in character but not compact: that is, developments and subdivisions, unbuilt, partly built or fully built of urban-size lots, scattered at random about the countryside, or straggling along main roads, often widely separated by farms or unused land from the next development, so that while the density of each is urban the overall density of any sizeable area may be as low as one family to every ten acres. (Map 2 illustrates a typical sprawl area in the lower mainland.)

On map No. 2 I have included a typical area of this kind of land use from the lower mainland. It is the municipality of Maple Ridge, but it could be almost any other area. On this map the dark areas represent the areas of urban development where there are people on urban lots, fairly compact houses. All I need to say is that any map of development in these transition areas would show a characteristic of clumps of housing scattered along major roads and stretched out along the various fingers, with little clumps of built-up areas separated by wide expanses of farm land.

MAPLE RIDGE LAND AND DEVELOPMENT, 1959





**METROPOLITAN AREA
LOWER MAINLAND REGION
OF BRITISH COLUMBIA**

- Agricultural Zoning - 5 ac. min
- Present Urban Development

0 1 2 3 4 5
SCALE IN MILES

MAP

HERE IS THE STORY:

This is part of North Delta -
about one square mile.

It contains -

- 223 houses
3 schools
a small shopping centre
a few small stores
one park site - undeveloped
a church
a number of smallholdings

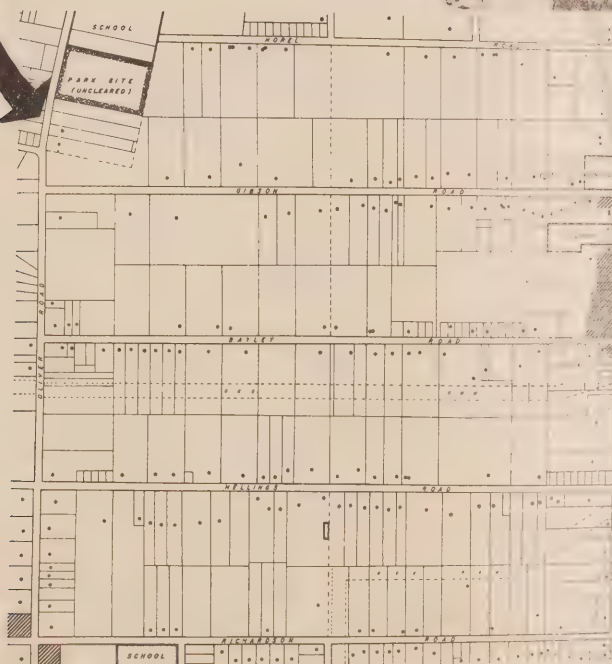
There are about seven miles of road.

About half the total area is unused.

What does it cost the taxpayer ?



Aero Surveys Ltd.



HERE IS PART OF THE BILL.

Laying sewers:	\$ 220,000
Laying watermains:	\$ 89,000
Paving streets:	\$ 44,000
Total:	\$ 353,000
Cost per house.	\$ 1,660

In an area developed at urban density, the cost per house would be about:

40C

That sprawls is extensive there is no doubt. Due to its nature it is difficult to measure precisely, but in the greater Vancouver area it is estimated that it covers 90 square miles, as compared with 80 square miles covered by compact urban development. (See map 3, Metro Area)

On map No. 3 you will see a sketch of the metropolitan area. The dense area, which is centered in Vancouver and New Westminster, with the stringer between, running through Burnaby, should be contrasted with the areas of typical sprawl development in Surrey, Richmond and Delta. That is the strung-out urban, but scattered kind of development that is so typical of this area and so many other areas.

There are many indictments against sprawl, ranging from the aesthetic to the economic. Basically the problem is that those living in sprawl areas are really city dwellers and would like, and in fact need, since their lots are so small, city services such as piped water and sewers. In addition they would like such services as convenient schools, shops and parks, paved roads, sidewalks, covered drains, etc. In other words, they are looking for urban city services. Yet to provide these services even to a minimum standard is often out of the question financially because of the low gross densities of development served.

By this we mean what you can realize, that if you have 100 people along a mile of road frontage, then there are 100 families to share the cost of building that road; and if there are 10 people along a mile of road frontage, there are only 10 families to share the cost of building that mile of road. It is just as simple as that. An illustration of this particular point is shown on map No. 4. It is a part of North Delta, in the suburban area of Vancouver. It shows a photograph of about one square mile of this part of North Delta, 640 acres, and it contains 223 houses, three schools, a small shopping centre, a few small stores, one park site, undeveloped, a church, and a number of small holdings; and the remaining agricultural land. In that area there are about seven miles of road; and about half the total area is unused. What does it cost the taxpayer? Here is part of the bill: laying sewers, \$220,000; laying water mains, \$89,000; paving streets, \$44,000; for a total of \$353,000.

Senator HIGGINS: Who would pay for the streets?

Mr. CRERAR: Normally it is the municipality's responsibility. The cost per house is \$1,660. In an area developed at urban density, the cost per house would be \$400. In other words, if you increased the density you would cut down on the cost to each person.

Studies by the Lower Mainland Regional Planning Board in a number of municipalities have shown that inevitably sprawl areas have been unable to pay the costs of the municipal services that they require. That was the result of this report on the economic aspects of urban sprawl, which you have previously had. They are inevitably deficit areas. Compact urban areas, under certain circumstances, can do so. Farm areas inevitably pay far more in taxes than they receive in services when they are in a municipality that is affected by sprawl development. Those were the essential findings of this study on the economic aspects of urban sprawl, Lower Mainland Regional Planning Board, 1956.

In addition to these unsatisfactory aspects is the sheer waste of land that accompanies this kind of development. Land is wasted by development being strung along road frontages, sterilizing the back acreage, and by being scattered in and about farmland breaking up potential economic units. In addition there is the unseen and probably even more significant waste associated with land speculation in advance of actual development. In one suburban municipality in Greater Vancouver between November, 1953

and November, 1958, 14,554 urban lots were created to accommodate 4,775 new homes, or over 3 new lots for each new house. At the end of a period of rapid growth a supply of vacant lots equivalent to 13½ years' demand existed; land was removed from production in 1959 that would not be needed till 1972.

Not only is land removed from production long before it is needed, it is often sterilized well in advance of either urban development or subdivision. Around San Jose, California, it was found that deterioration of orchards was closely related to anticipations of urban demand. (*Determination of Land Use in Rural Urban Transition Areas*, Dr. Lessinger, Berkeley, California, 1956).

He found there was a definite correlation between people, as it were, just abandoning their farms and their expectations of where urban development would occur. General observation indicates that this is a common phenomena, with the anticipation of urban development leading to "land mining" well in advance of actual city development. "Land mining" is when you start taking everything out of your land and do not put anything back because you think that in five or ten years, or in some short time in the future, you are going to be subdividing it down and getting rid of it, in any event.

When these factors are consolidated we find that the growth of Canada's metropolitan regions between 1951 and 1956 caused an average loss of 382 acres of farmland for each 1,000 population increase. (See *The Loss of Farmland in the Growth of the Metropolitan Regions of Canada*, a brief to the Resources for Tomorrow Conference by A. D. Crerar). This was the major result of my examination for the resources for tomorrow conference. I took all the major cities in Canada—Ottawa, Quebec City, Montreal, Vancouver, Winnipeg, London, Toronto, Hamilton and Windsor. I found, with the exception of Ottawa and Quebec City, that in the three big centres—Winnipeg, Toronto-Hamilton, and Montreal—the loss of farm land was around this 382 acres per thousand population increase. In Winnipeg it was 381; in Toronto-Hamilton, 382; and in Montreal, 374. In my view, there seems to be the same kind of process operating in all these places, taking out about 382 acres of farm land for each thousand people added.

I am not in a position to judge the consequences to the national agricultural picture of losses of land of this order. It is sufficient to say that the Gordon Commission envisages an increase of 8,800,000 people in Canada's metropolitan regions by 1980, which at the rates established between 1951 and 1956 could mean the loss of 3,360,000 acres of farmland, or an area equivalent to the whole of the farmland in Prince Edward Island and Nova Scotia. It nevertheless represents only about 2 per cent of Canada's farmland in 1956. I might say that is the best or some of the best 2 per cent that we have. It is land in the lower Fraser Valley; in the Toronto-Hamilton-St. Catharines' area; land around the city of Montreal; and if you name the fairly good agricultural areas, then that is where we are going to lose it.

What does seem to be important is that about two-thirds of this loss can only be described as waste by any conceivable standard. It is the waste of land that raises costs and municipal taxes, that blights the countryside and makes the provision of even minimal standards of city services either expensive or impossible.

That is the end of my first part. And now I come to:

II. Causes

It is only within the last thirty years that we could develop our cities in this way. The obvious basic necessities are universal motor car ownership and the accompanying road system. These permit growth to penetrate anywhere within 50 miles of the centre of town.

Changes in corporate attitude have removed most natural controls on scattered growth. Thirty years ago utility companies, both public and private, had a whole series of charges which the scattered and distant dweller had to pay, extra charges for the extension of pole lines, service charges, frontage taxes or the simple refusal to provide the service. The charges were based on the fact that the provision of services to scattered population is uneconomic, and the general belief that no one segment of the population deserved a subsidy, the philosophy that you should only get what you pay for. Today, of course, such an attitude would be unthinkable and utilities are encouraged at every level to equalize charges throughout their area of service and to extend their services with only minimal regard to the additional costs. It is deliberate, though perhaps not conscious, policy to make every segment of the metropolitan region as much like every other as possible in terms of the cost of public utilities.

Families are now free to locate anywhere, since they have cars, and do not pay an extra economic charge for living at low densities. There are also the positive attractions of "country living", fresh air and space, and the contrasting dirt and congestion of the central city, to lure people outwards. We really do not know, as yet, how much the positive attractions mean in terms of enticing people out and how satisfied they are when they get there. The Lower Mainland Regional Planning Board is at present conducting a survey to obtain these specific facts. It would seem, from casual observation, that the attempt is to build a new "suburb" by setting down 10 or 50 or more houses on city lots in the fields out from the central city. It would seem that what is wanted is an extension to the city and that people are locating here because they can not find housing at prices they can afford within the built up sections of the city.

The most obvious explanation of why this new addition to the city is built so far out is that there is no vacant land left within, or close to, the city. This is a common impression, but on examination it is found to be completely erroneous. *House and Home*—which I might mention here is a house building magazine which is put out by the *Time* organization for the home builders and building contractors in North America, and which is not to be confused with *Home and Gardens*—has examined conditions around eleven major American cities and found that there are millions of acres of by-passed land closer to town than most of today's new tracts—more millions of acres of by-passed land than the housing industry will need for many, many years. The United States Census of Governments reported in 1957 that there were 13 million vacant lots of record in the United States, about 13 times the annual consumption in new constructions.

In every Canadian city that I have examined the situation is the same, vast supplies of by-passed land, of subdivided but vacant land exist. But in spite of this plenty, prices for vacant lots continue to advance. In the same suburban municipality mentioned earlier, where between November 1953 and November 1958 14,544 new lots were created to permit the construction of 4775 new homes, the price of lots advanced from approximately \$950 each to between \$1200 and \$1500 from 1954 and 1959.

Two major explanations can be given for this anomaly of price advances in the face of massive oversupply. The first is simply ignorance. Few know what the state of the land market at any time really is. How can they? No record is kept of the number of vacant lots available, or of the number added in any period. In every other industry the state of the inventory is known weekly or monthly, plans are made and prices adjusted on the basis of this knowledge. But for any city in Canada it is impossible to tell how many vacant lots there are, or how many new lots were added to the stock in the last month, the last year or the last decade.

The second general explanation for rising prices in the face of an over supply of land is the psychology and reaction of the land market. Each succeeding seller holds out for a higher price than his predecessor and prices advance in an exponential fashion in relation to development. Unfortunately no details of the workings of this phenomena in the residential land market can be given. However, a very detailed examination of the industrial land market has been made in the course of my Board's studies and it is assumed that residential land prices would react in the same way, though on a quite different scale. The graph shows the relationship between percent of land developed and median assessed land value. (See graph IV). To translate this into more meaningful terms the table below shows the development history of a 100 acre parcel on line with the material plotted.

<i>Number of Acres Occupied</i>	<i>Median Value (\$ per acre)</i>
10	\$ 2,300
20	2,800
30	3,500
40	4,600
50	6,400
60	9,400
70	16,000
80	31,000
90	90,000

This graph has been tested statistically with the material we got from our industrial land survey, and we found the statistical correlation to be excellent, and it seems to be a true picture of at least the way the industrial land market reacts. From what we know of the residential land market I think this would be the way that it would react. The scale would be different. It would never reach as high a figure as for industrial land. The point is that it takes only very little development to bring about a very, very large increase in price, and I think most people know this and react in this way to this knowledge.

The result is that only a small amount of development is necessary to increase the price substantially. What happens in practice is that the buyer is forced out to areas that have experienced little or no development to obtain land at the price he can afford to pay. It is this leapfrogging outwards and the bypassing of the logical land for development that is the root cause of urban sprawl.

However, even this frantic outward search has not brought lower land costs. In the Vancouver area 55% of the increase in the cost of building a single family NHA home between 1951 and 1958 was due to the increase in land prices. During this period the cost of building a standard house went up by 11.2% while the cost of the average NHA lot went up by 132%.

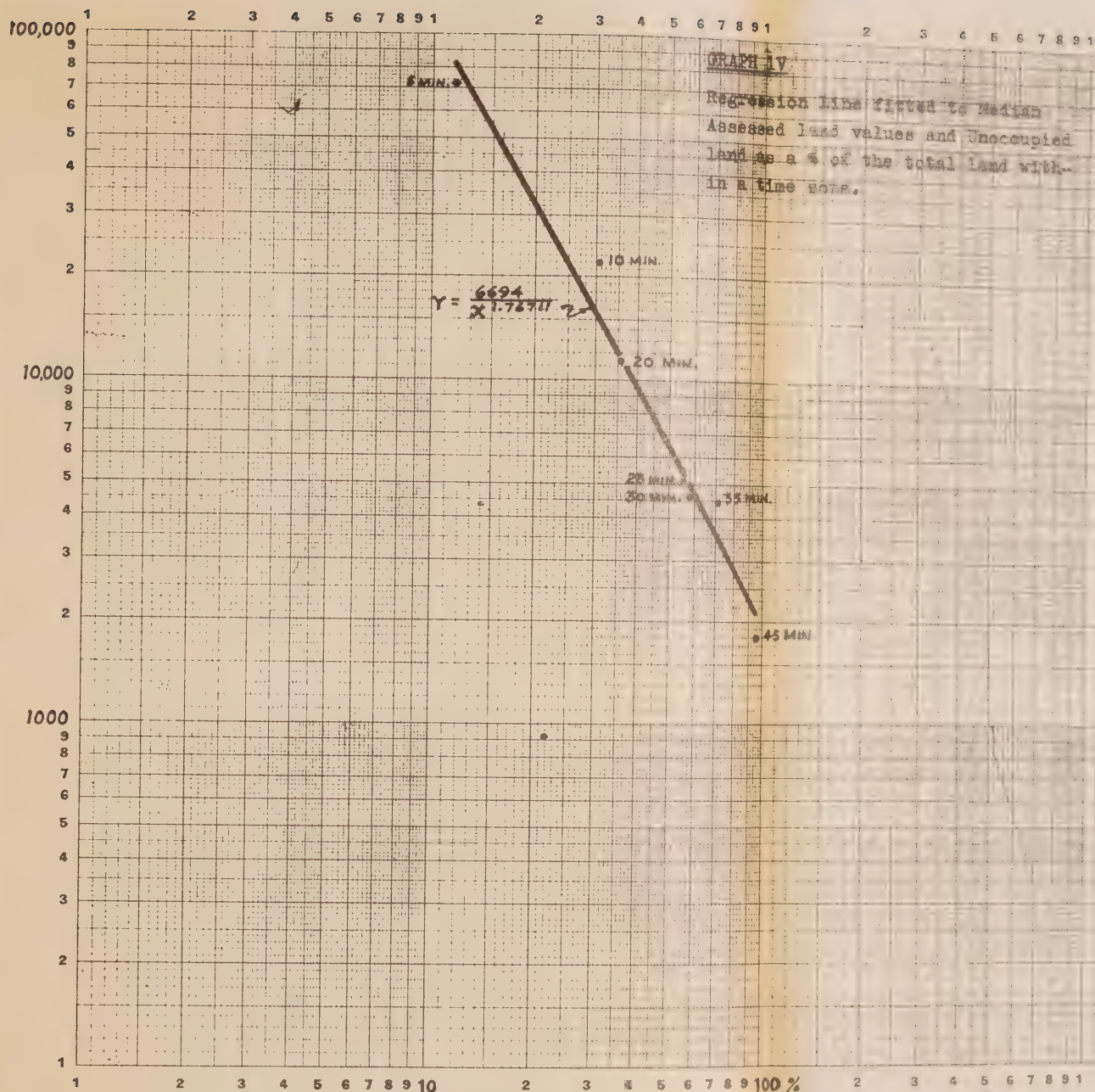
Senator HIGGINS: What is an NHA lot?

Mr. CRERAR: It is a lot on which loans under the National Housing Act are granted, and in 1958 the average NHA lot cost 132 per cent more than it did in 1951.

There is no need to labour the importance of high land costs at a time when Canada's building industry is stagnating in spite of the unsatisfied demand for housing among the lower third of our income groups.

There is one other point. Planners across Canada have identified urban sprawl and have remedies for tackling it. Municipal councils in every section of the country have the power to adopt measures to control it. But the will to tackle the problem is paralyzed. Politically it is difficult to draw a line and

1959 MEDIAN ASSESSED LAND VALUE (DOLLARS PER ACRE)



% OF TOTAL LAND UNOCCUPIED WITHIN TIME ZONES

say "thus far and no farther", thereby depriving one group of a possible speculative gain and, if the line is drawn tightly enough, to increase land prices on the urban side of the line. The enormous pressures building up in the UK to disintegrate the green belts shows the lengths to which this can go. They did, in fact, draw the line and try to hold it very strictly in the United Kingdom, and now this endeavour to contain development within a limited area is having a reaction in the prices that they have to pay for land.

III. Solutions:

Must we then contemplate a future of continuing land butchery and land waste; of sky-rocketing municipal taxes and land prices?

If nothing were to be done the answer is certainly yes, and in addition the end result would be another "land bust" such as has marked the end of every speculative cycle that we have experienced up to now. There have been a number of them. Every period of advance in agriculture and development has, I think, experienced a land bust. This is quite evident.

There are remedies available at every level of government but I will concentrate here on those which naturally fall to the Federal Government.

1. Information: As was pointed out, much of what has occurred is due to sheer ignorance and misinformation.

- (a) Records on potential building acreage, the number of vacant lots, the services that they have and the price for which they sell should be collected on a national basis. A month by month record by census tract and municipality should be made. This information is readily available in municipal records, assessment rolls or Land Registry offices right now. All that is required is that it be collected on a systematic basis and be disseminated regularly. It would be no more difficult than keeping track of the number of eggs in storage, the amount of timber sawn or the number of building permits issued.
- (b) The program of land use studies in the metropolitan regions by the Geographic Branch of the Department of Mines and Technical Surveys should be accelerated. This is the best record of what is happening to the land about our major cities and will provide a firm foundation for any future studies of city growth.
- (c) Further study of land use and land cost is essential. Such studies can only be meaningful when the whole area of the metropolitan region is examined. The material included here on industrial land cost in relation to development was only found because the Board examined the whole of the area influenced by industrial development without regard to municipal boundaries. A similar examination is necessary for residential land and again it can not be restricted to anything less than the whole area affected by residential development, that is the metropolitan region. The Lower Mainland Regional Planning Board hopes to carry out such a study this year, if time and funds permit. But such studies should not be the by-product of individual Boards in isolated instances, they should be the continuing concern of a body which could investigate the problems of any urban area in Canada. Such a body should have the same relationship to our cities that agricultural experimental stations have to farming.

2. In cities where land prices have got out of hand direct action might be necessary. This would involve the acquisition by a government agency of supplies of building land which would then be released to the open market at a price below the going rates. It would involve a deliberate attempt to break the market for residential land.

Central Mortgage and Housing Corporation has the power to do this at the present time, either in conjunction with provinces and municipalities or by itself. Such a course was suggested at the convention of the National Home Builders in Montreal last month. In reply Mr. Bates, the president of CMHC, was quoted in the *Toronto Telegraph* as saying "You would have to acquire land for an area of five or six miles around each urban centre to make it work. It would mean nationalization." Mr. Bates would be perfectly right if a real land shortage existed, such as is the case in the UK. But I would insist that no such shortage exists here and that only a relatively small alternative supply at a reasonable price, or perhaps even the announced determination to undertake such a course, would be sufficient to bring land prices down. Neither Mr. Bates nor myself, however, is in a position to prove his contention, since the facts with which to do so do not exist, that is, information on the supply and price of building lots.

The reason I say that even the announced determination to undertake such a course would be sufficient to bring land prices down is that I recall a case where they decided to build a pulp mill in the municipality of North Cowichan. There were certain people who wished to make speculative gains on the new development it would bring. Reeve Murchison, a very vigorous person, announced that if he found the price of land and lots increasing too much the municipality would subdivide some of the land it held and place it on the market at a price which the workers in this pulp mill could afford. The announcement of this intention, and the fact that Mr. Murchison was a very vigorous and determined person, was sufficient to hold down prices in that particular municipality. That is the reason I can say this announced determination would be sufficient.

3. A re-examination of public utility policies is necessary. For the last 30 years every extension of rural electrification, of natural gas supplies or telephone free calling service has been greeted as an unmitigated blessing. Certainly there is much to be said for it; rural electrification, for example, is completely justified in enabling the farmer to be a more productive member of society; whatever subsidy he has received has been amply repaid. However, can the same be said for areas of urban sprawl? Is the subsidy required from the city dweller justified when it enables straggly knots of residential housing to locate anywhere within 50 miles of the city centre at no extra cost for the extra burden?

Other remedies are available to the provinces, such as exempting farmers within agricultural zones from the burden of municipal taxes. Such relief should only be provided when farmers are prevented from subdividing their land and receiving the possible benefit of urban prices.

The shift of municipal taxation within urban areas from improvements to land would also be of great assistance in combating sprawl.

However, all the previous suggestions would probably be of little help if they were not accompanied by an increase in the score and acceptance of city and regional planning. The measures suggested would enable better planning to be done, they can not replace planning. There are at present only four cities in Canada which can hope to completely control urban sprawl because there are only four cities in Canada that have planning boards whose jurisdiction covers the whole of the metropolitan region, the whole area within which the problem occurs. Of these cities, two—Calgary and Edmonton—also have the problem of land prices well in hand due to municipal land ownership. Winnipeg's new metro planning area covers the whole zone of urban influence and they will probably be able to tackle the problem satisfactorily. The fourth area is the Lower Mainland of British Columbia. The Lower Mainland Regional Planning Board has been operating in an advisory capacity; it can identify problems but do little about them, except by persuading individual

municipalities to adopt policies that are good for them and the region too. No other cities in Canada, including Metro Toronto, are capable of tackling the problem of urban sprawl with complete success, since they have no jurisdiction over the whole of the affected area. Until they do, sprawl cannot be truly checked.

The CHAIRMAN: Thank you, sir. There is a lot of substance in your brief. Are there any questions?

Senator SMITH (*Kamloops*): Mr. Chairman, is it not a fact that one of the key factors in this whole thing is control or lack of control of the speculative development? I say that, because you mentioned the number of lots that are still left vacant in marginal areas between the core of the urban centre and the sprawl developments. Now, is that not because large areas of that later development which is close to the core of the urban centre has gone into the control on a wholesale basis and the individual is driven out to areas further away to get away from that largely controlled area?

Mr. Crerar: No, I do not think this is due to speculators, because almost everyone is a speculator who is thinking of subdividing this land up. It is just a natural factor, it would seem to us from our studies, that as an area builds up that happens. If you take 100 acres and build up 30 acres, the price just goes up, and goes up in a regular fashion, as we have shown on the graph. In fact, we can give you a formula for that, which we have put on the graph. Where the price goes up in relation to the amount of development that there is, what happens is that a person dealing in real estate knows that this is the way land prices react. Development of a certain amount brings a great increase in price. In other words, you add 10 per cent more development, and instead of your price increasing by 10 per cent your price instead may increase anywhere from 50 per cent to 120 per cent. The point is that prices increase much more rapidly than development does, and it is not so much due to people speculating, but because they know this kind of relationship—more development brings higher prices.

The CHAIRMAN: Do you mean the ordinary person buying a lot is a speculator, or do you mean the builder?

Mr. CRERAR: Well, it is largely the person who has acquired land and is releasing it on the market, or holds it—sits with it. The longer he sits, the more development goes on, the better off he is going to be, actually. If he sold at the beginning of the development he would only get a relatively small price. If he can hold for ten years, and does not need the money at that time immediately, by that time the area is 50 per cent developed. We can just look at this particular graph again. Suppose he sold when the area was only 10 per cent developed, he would have got a price of \$2,300. If he had held it until it was 50 per cent developed, he would have got \$6,400. In other words, he would almost have tripled, or just about tripled his value if he had held it. If he had been able to hold on a little longer, and held it until it was 70 per cent—supposing he had the last 30 acres in a 100 acre block and brought it on the market himself at that time, and the area was 70 per cent developed he would get something like \$16,000. In other words, if he had been able to hold from the time it was 50 per cent developed until it was 70 per cent developed, he would have again, well, almost tripled; but the figures get bigger, the rise keeps on going in that fashion.

Senator STAMBAUGH: Of course, the amount of taxes would have a great deal to do with it; and if the development was slow he might as well have a quick profit and turnover.

Mr. CRERAR: The more rapid development takes place the more temptation to hold on to land for the speculative increase—the rise in value; and of course instead of 25 years, so that the more rapid our cities grow the more temptation

to hold on to land for the speculative increase the rise in value; and of course the less taxes are on land the more incentive there is to hold on to the land for the speculative rise.

Senator STAMBAUGH: In your brief, you say:

"It would seem that what is wanted is an extension to the city and that people are locating here because they cannot find housing at prices they can afford within the built-up sections of the city."

Now, in my experience that very often is not the case, and people sell houses in the city cheaper, and build several miles out at nearly twice the cost.

Mr. CRERAR: Well, the reason I say this is because the kind of housing that I am discussing here, that is going up out there is often city housing; it is a city lot of 60 by 120, to build just on the outskirts of the city if he could find what he wanted, but does not particularly want to move out too far, preferring rather to move out about half a mile.

Senator STAMBAUGH: I think you would find in a great many cases, that many of the houses on sale inside the city would be substantial brick houses of two storeys, but they want split level houses a little further out which are not nearly so substantial. I am only speaking from my experience.

Mr. CRERAR: Well, we really don't know. As I have said, we are going to conduct a study this year to find out just what people are looking for when they move out of these areas, and we hope to be able to give statistics which will show that 25 per cent do this, and 30 per cent move out to these areas for this reason. We don't really know right now, and we are merely making a guess, I must say.

Senator HIGGINS: You show in Map 4 a square mile area containing 223 houses, and that the cost of laying sewers and water mains and paving streets amounts to a total of \$353,000, and the cost per house is \$1,660; also that in an area developed at urban density, the cost per house would be about \$400. Supposing other people came along afterwards and built in the same area and took advantage of all the improvements, what would they be charged, the same amount of money proportionately?

Mr. CRERAR: Well, it depends largely on when they came in, because, as you know, with taxes and all that kind of thing, it goes on for a 20-year period.

Senator HIGGINS: Would the people who own the 223 houses be paid back any of that?

Mr. CRERAR: No. It would reduce to each person the cost of—

Senator HIGGINS: The first 223 people pay the full amount?

Mr. CRERAR: Well, yes, they would. They would have to pay the full amount.

Senator HIGGINS: In other words, the municipality would pay those costs, and the other people would get the advantages when they came in?

Mr. CRERAR: Yes. Of course, the thing is that this area was peculiar in that it did get sewers, water mains and streets. What normally happens, in our areas at least, is that they don't get streets. They do get water. Normally, that is what occurs in these areas. We get watermains, gravel roads, open ditches, septic tanks—that is the extent of the services.

Senator HIGGINS: What number of taxpayers could ask for these improvements? Could a minority be forced to join in?

Mr. CRERAR: Yes. A money bylaw is put before the voters and if two-thirds of the land holders approve, that is two-thirds of the assessed value must approve such a bylaw, then the other one-third must come in.

The CHAIRMAN: Is there any law preventing a farmer holding on to his land and then selling it later on in this urban sprawl?

Mr. CRERAR: If you would look at map No. 3, I can show you what the situation is in the lower mainland. In map No. 3 you will see a stippled area called "Agricultural Zoning, 5 acre minimum". You will see Surrey, Richmond, Delta, Pitt Meadows—the stippled area shows an area which is called an agricultural zone. The minimum area to which land in this zone can be subdivided within these zones is 5 acres. This is designed to prevent urban sprawl from occurring. Of course the thing is that the sprawl development is so great now in lower mainland, particularly in Surrey and Richmond, that all that is being done by this 5-acre limit is to prevent a few scattered developments from locating within the agricultural areas. The hook-up of these zones forms a continuous green belt around the greater Vancouver metropolitan area and Pitt Meadows, Surrey, Delta, and Richmond zones in effect form a green belt around the urban development and the large metropolitan area. This has been achieved by each one of these municipalities individually passing zoning bylaws with this 5-acre minimum feature because they wanted to encourage dense development in certain areas, and they could then bring services to those areas and build them up, all of which would not cost the taxpayers too much, and then gradually extend outwards with the services. Although we did use persuasion to convince them this was a good thing, actually each of these municipalities passed their own bylaws.

The CHAIRMAN: It was not done at the behest of the province?

Mr. CRERAR: No, nor by any super force—it was done by each of these municipalities individually. We had urged this on them of course and in most of these cases these bylaws were passed following our recommendations, but they adopted them individually.

Senator TAYLOR (*Westmorland*): How long did it take them to get into the frame of mind where they would be willing to do that?

Mr. CRERAR: We had to work, I think, seven years to get our first convert, which was Surrey. That was about 1957, or 1956. The rest of them have come within the last four years—that is the other four municipalities.

Senator TURGEON: There has been a great deal of development done in that vicinity by a group of persons who are bent on bringing in industrial development. This group was from the United Kingdom if I remember rightly. Did their plans have any large effect on bringing on this sprawling municipal development you speak of? Or did that come all by itself?

Mr. CRERAR: I would take it that you are speaking about the development of Annacis Sound. This is an island which is connected to New Westminster rather than to the other side of the river. I do not think the industrial development that occurred in that area has much to do with the municipal development which has occurred. I happen to know this area well. I could give you maps of this area, but I could also give you maps of any area in Canada, except Calgary and Edmonton, and probably Winnipeg, where the same kind of conditions prevail. I could probably refer you to a map of Ottawa and show you that the same kind of thing occurred here.

Senator SMITH (*Kamloops*): Is there any lesson to be learned from the development of these new cities like Canberra, and the capital city of Brazil, Brasilia? Are those developed on a leasehold basis, or is the land held on a freehold basis?

Mr. CRERAR: I do not really know exactly what system they use there. I would imagine a capital like Brasilia would probably be operated on a leasehold basis.

Senator SMITH (*Kamloops*): That is the way Washington is, is it not?

Mr. CRERAR: I really do not know, Senator Smith. I could not answer that question. I do not feel that it would be too practical to operate on that kind of basis here, inasmuch as we are a freehold country, as it were.

Senator SMITH (*Kamloops*): It was just a matter of information. I wondered what they did in those places because I understand that it is not freehold in Washington, and that is tied to the fact that they have no franchise there.

Mr. CRERAR: I could not give you any information on that.

The CHAIRMAN: Referring to map No. 3, I see a line showing the new Trans-Canada highway running southeast from Fraser Mills to Abbotsford. Now, look at the line of the existing highway, which runs through Langley. Along this highway we see little spots of urban development here and there. Can you tell us if they anticipate anything in the way of stopping that same type of development along the new highway?

Mr. CRERAR: No.

The CHAIRMAN: They can go ahead?

Mr. CRERAR: Yes. This is our problem at the present moment. Our Board is very disturbed by this. There is another limit on there which I have not mentioned so far. It says "one-half hour travelling time from new bridge at Port Mann." I would say that this line is the extent to where development can spread. Previously it extended through this rather straggly development we see around Surrey. That was pretty well the limit where people could locate and get back into the city to work each day. I think when the new Trans-Canada highway is completed they will be able to go out to this other line which represents a half-hour travelling time from the Port Mann bridge. That brings a whole new threat of another stage of sprawl development which might lead to breaking this green belt which we have so laboriously constructed here, in a way.

The CHAIRMAN: With regard to the construction of these new super highways, should there not be some regulation over construction or development along those highways? You build the highways for speed, to ease people in and out of cities; and then you allow filling stations, motels and little stores to build up, which necessarily slow down speeds, because of the danger in those areas?

Mr. CRERAR: This is very true.

The CHAIRMAN: That is a very serious problem, is it not?

Mr. CRERAR: Yes. The new Trans-Canada Highway, itself, is limited access.

Senator SMITH (*Kamloops*): That is a freeway, is it not?

Mr. CRERAR: Yes. There are only access points every two or 2½ miles, so that the highway itself will not, as it were, be built up with this ribbon of commercial development—the hotdog stands, filling stations, and so on, all strung out, which the old Trans-Canada Highway, in every part of Canada, I suppose, has experienced. What will happen, of course, is that the new development will take place just at these cloverleaves and will spread back from one cloverleaf towards another. It will just mean the same kind of thing will occur. It will not be strung out along the highway, but will take place on the secondary roads, off the cloverleaf, and then you will run into the hotdog stands and so forth. Of course, it will increase the traffic on the highways further out and probably will necessitate additional or new lanes at some future date.

Senator SMITH (*Kamloops*): Is there any thought to combat that type of development at all now?

Mr. CRERAR: We hope to this year. We now have legislation which enables us to prepare a regional plan for the greater Vancouver lower mainland area.

We hope to prepare a regional plan this year, because we have been working for 10 years now on this, and we have accumulated a mass of information. We are in a position probably to prepare this plan for the Vancouver area. Then, if the plan is adopted by two-thirds of the member municipalities in the lower mainland—that is, approximately 19 municipalities agree to the plan—then it will be binding on all of them. So, this is our hope, that we will be able to get the plan completed this year, and that it will be accepted by two-thirds of the member municipalities. Then it will become a binding regional development plan.

Senator TAYLOR (*Westmorland*): What about these limited access roads on to the Trans-Canada Highway? Is there any way of preventing this type of development there? You say there is a limited access road coming in every two or 2½ miles; and that going back on the Trans-Canada Highway 100 yards, or 200 or 300 feet, you are building a secondary road and that area is becoming built up, and you get a mile on one side and a mile on the other side, so that you are going to have a continuous band of development. There is nothing to prevent that, is there?

Mr. CRERAR: No.

Senator HIGGINS: Senator Smith, you were referring to the distinction between freehold land and leasehold land.

Senator SMITH (*Kamloops*): I am not trying to promote anything, and I have no idea about the leasehold; but I just wondered how that works out in these new developments, where they are putting in these big, planned cities.

Senator HIGGINS: The reason for the long lease is that the person who gets the land pays really a freehold price and it is leased to him for 99 years for a peppercorn rent, so that in the lease you put certain covenants the landlord can assess on, and they run in a leasehold but not in freehold. That is the way they do it in Newfoundland, so that you have control over all the houses and prevent people doing certain things.

Mr. CRERAR: This is quite a useful device.

Senator HIGGINS: They are 99 or 999-year leases.

Mr. CRERAR: Under the present legislation, the municipalities in British Columbia are prevented from leasing for more than seven years.

Senator HIGGINS: But you would not build a house for a lease of seven years.

Mr. CRERAR: No, but with this kind of provision it means that no municipality ever enters into a lease because there would be no one willing to take up a lease from a municipality if it was only for seven years, which is the maximum they can give. We and the various planning organizations have suggested leasing on a long-term basis should be open to municipalities as well as everybody else.

Senator HIGGINS: I do not say it should be, but they can do that, and it would be very profitable because then they would have control. They would be able to say, "You cannot build anything else on this land," "You can only do certain things," or, "You cannot build a shop there."

Mr. CRERAR: This would be a very useful device, but it is one which is not empowered at present in British Columbia.

Senator SMITH (*Kamloops*): Why restrict it to seven years?

Mr. CRERAR: I am not sure, and I have no idea as to what the intention behind that was; I just do not know. I know that is the situation at the present time; and we, the planners' organizations in British Columbia, have asked this to be extended so that the municipalities can lease for a 20-year period.

Senator INMAN: Ninety-nine-year leases create an awful lot of trouble sometimes. I know of cases where they have.

Mr. CRERAR: Yes. I am not too familiar with the advantages and disadvantages of lease-holding myself. It is practically unknown, in my experience.

The CHAIRMAN: In your development, in your municipality, you have a small area which pays. I think that is in map No. 4. Does not all of the frontage property pay the taxes?

Mr. CRERAR: That is right.

The CHAIRMAN: All that property pays the taxes?

Mr. CRERAR: That is correct.

The CHAIRMAN: Irrespective of the fact there are only 223 houses in that area, every foot is assessed so much for water and so much for sewers?

Mr. CRERAR: If it is done on the street frontage basis this would be true; everybody would pay in proportion to the frontage they have. But there are two fees, a flat fee, normally, and a frontage fee in addition. So the flat fee is what each house pays. Then people with an extensive frontage will pay some additional part of the cost.

The CHAIRMAN: You have to have a flat fee to start with, so as to cover your debenture?

Mr. CRERAR: Yes. This will vary the conditions on the flat fee, as to how much you pay. If the flat fee covers 80 per cent of the cost, then actually the cost is being borne mainly by each household. If the frontage tax bears 80 per cent of the cost, then most of the cost is being borne by the landholder who has frontage on the street. Normally, they split it so that the houses pay most of the cost, and the frontage owners only pay a relatively small share.

Senator SMITH (*Kamloops*): Just before we conclude, Mr. Crerar, you mentioned a different situation existing in Edmonton and Calgary. Years ago did they have what they call a single tax which discouraged the holding of vacant land, which added a penalty to the owner of vacant land, who bore a greater share of the tax load than the improved property holder? Had that anything to do with the situation in Edmonton and Calgary?

Mr. CRERAR: Well, if they had had a single tax—which I am not sure about because I do not know the situation there—it would certainly have been of assistance to them. All I know about the Edmonton and Calgary situation is that they have extremely good planning boards or commissions, and also that they have considerable areas of municipal land which they release at reasonable rates to enable homes to be built. They have control on the one hand, and on the other hand they can release the land and have it developed in an orderly fashion with all of the services installed before moving on to another area, in which they will again extend the whole area outward. Incidentally, Edmonton and Calgary are the fastest growing cities in Canada.

Senator STAMBAUGH: I can give some information with respect to that single tax. It is true that for many years they had a single tax, but what happened was that in every little depression the taxes were so high on vacant lots that they went back to the city. When the time came for Edmonton and Calgary to have some control they held about two-thirds of the vacant land inside the city limits. They had thousands of lots which were already serviced by sewers and water, so they had a good start.

Senator HIGGINS: I am sure, honourable senators, that we all thank Mr. Crerar very much.

The CHAIRMAN: Yes, Mr. Crerar, thank you very much for coming here tonight.

Senator TAYLOR (*Westmorland*): Mr. Chairman and honourable senators, may I make a brief explanation of why it was necessary to have a revised printing of the Proceedings before the committee of February 2, last.

On that occasion the committee did me the honour of appointing me Acting Chairman for the day, and in that capacity I acted.

On page 17 of the proceedings, while speaking of the necessity for completion of the soil survey of the country, I am reported to have said:

It will be one of the first recommendations from the Land Use Committee to the Government.

That of course should read:

That was the first recommendation from the Land Use Committee to the Government.

Further, throughout the body of the report the name "Mr. Kortright", President of the Conservation Council of Ontario, the organization which was making representations before the committee, was mistakenly used for "Mr. Henderson", the Executive Director of that organization, who presented the brief and testified before the committee.

A limited number of copies of the first printing of the proceedings were distributed, and at least one misleading newspaper article was brought to my attention. Copies of a revised printing of the corrected proceedings have now been received and distributed.

Honourable senators, I offer this explanation so that the matter may be clear to all.

The committee adjourned.

Ottawa, Thursday, February 16, 1961.

The Special Committee on Land Use in Canada met this day at 11 a.m.

Senator ARTHUR M. PEARSON in the Chair.

THE CHAIRMAN: Honourable senators, we have a quorum, and since we shall probably have a busy morning I think it would be as well to start right away. Dr. Ripley is here to present his brief. Then shall we have questions after your brief has been read, Dr. Ripley, or shall we wait until Dr. Stobbe is finished?

DR. RIPLEY: I think probably it would be as well to have questions after my brief has been read, because Dr. Stobbe's is slightly different.

THE CHAIRMAN: Thank you. Dr. Stobbe will speak on "Land Use in Relation to Soil Adaptability."

Dr. P. O. Ripley, Director of Soils, Department of Agriculture: Mr. Chairman and senators, I have outlined in the brief the subject of soil erosion in Canada. This matter of soil erosion is a factor in soil land use and soil conservation which has interested people right down through the centuries. The history of soil erosion in China, for instance, is very old and very drastic. The United States' soil conservation people have featured soil erosion, and in fact soil erosion control in the mind of many people is soil conservation, and a number of people feel that it is the only factor. We think it is much broader than that,

of course, but erosion is one of the factors with which we have to contend, and I have tried to present in this brief something of the importance of it in Canada.

Due to the climatic and farming conditions in Canada soil erosion has not been as important as it has appeared to be in the United States and some other countries. In 1950 our soil survey people prepared a map for the food and agriculture organization, and we were asked to present in some way the extent of erosion as we saw it in Canada. The approach that the soil surveyors made in this connection was that they divided it into what they called slight or practically no erosion, moderate erosion, and severe erosion. The slight or non-erosion was where the productivity of the land had been reduced by less than 10 per cent. The moderate erosion was where it had been eroded and the productivity reduced a matter of 10 to 35 per cent. Severe erosion was that erosion which lowered the productivity in the area, in the estimate of the soil surveyors, more than 35 per cent. The map was drawn, and the coloured area represents the area of improved land, really, and as I pointed out the last time I was here, one of the things I would like to stress is the rather small amount of improved farm land that there is in Canada. Only 6 per cent of the total land area is improved farm land. Now, as you see, this map shows a yellow area where there is little or no erosion taking place, and it represents in Eastern Canada about 70 per cent of the improved farm land having slightly or no erosion. The blue coloured area is the moderate erosion, and it represents in Eastern Canada about 26 per cent of the total improved land area. Under severe erosion—and you can hardly see it—there are just little spots of red indicated; it is very localized and hard to show on a map of this kind; but in Eastern Canada it represents about a million acres. The soil surveyors figure it is 4 per cent of the total land area.

The figures for Western Canada have just been obtained, and the estimate in 1950 in Western Canada is—and this includes both wind erosion and soil erosion and water erosion—that the extent of slight or non-erosion was 76 per cent, and of moderate and severe erosion, 22 per cent. I do not know whether this figure means very much or not, but we will try to estimate in some way what the erosion was. We compared this, though, with some of the estimates of erosion in the United States. In the New England states and in the mid-Atlantic states, and east north central states, that is, an area very similar to our area in Eastern Canada, the conditions are very similar, and you may expect probably that the situation would be about the same, and it is. As I have stated in the third paragraph of the brief, it was estimated that in the New England, middle Atlantic and east-north-central regions of the United States, where conditions are similar to Eastern Canada, 71.8 per cent suffered from slight erosion; 25.4 per cent from moderate erosion, as compared with 26 per cent in Eastern Canada; severe erosion was 2.8 per cent in these north-eastern states, compared with our 4 per cent in Eastern Canada.

Erosion is much higher in the east-south-central states, which include Louisiana, Arkansas, Tennessee, Kentucky and Missouri. The annual precipitation in this area ranges from 30 inches to 80 inches, and there is very little frost during any part of the year, hence the soil is open for erosion all year round. They are not in the deep freeze like we are in parts of Canada for five or six months in the year, and erosion is a potential there all the time. That is indicated by the amount of erosion; the slight or non-erosion is 18.1 per cent, the moderate erosion, 51.9 per cent, and the severe erosion, 30 per cent.

In order to get some idea of what erosion will do, we ran an experiment in Ottawa a few years ago. As a matter of fact this experiment was handled by Mr. Dixon, who is with us this morning. He brought out a little publication a few years ago, from which I got the figures. We simulated erosion. This was not actually eroded land, we simply removed certain amounts of top soil,

three inches in one case, and about six or seven inches in another case. We grew barley and alfalfa on these soils, and the barley yield over a 10-year period, with no fertilizer, where the soil was undisturbed, was 27.8 bushels per acre. When we removed three inches of the surface soil this yield was reduced to 22.1 bushels per acre, a reduction of 5.1 bushels.

Senator TAYLOR (*Westmorland*): Did you say that where there was no soil removed it was 27.8 bushels per acre or where the seven inches of soil had been removed?

Dr. RIPLEY: On the undisturbed soil, with no soil removed. It is not a high yield, this 27.8 bushels, but it does give the relative difference. Where three inches of the top soil was removed it was reduced to 22 bushels, and where we took the whole of the surface soil off, seven inches, we only received 3.8 bushels of barley, practically a crop failure.

Senator STAMBAUGH: How long had this land that you were using in the experiment been cropped before? It was not new land?

Dr. RIPLEY: No, this was in the middle of our experimental farm. It was in Grenville sandy loam.

Senator STAMBAUGH: That would make a difference in the low yield, if it had been cropped for many years. The value of the soil is gone.

Dr. RIPLEY: Well, as yields go, I expect the average yield for the province of Ontario in barley is 25 bushels. It is not as low as all that. We were able to increase the yield to 42 bushels by adding a bit of fertilizer to this particular soil, so that it was not all that bad. We grew alfalfa then, after the barley, and alfalfa is a crop that will grow fairly well on subsoil. Where the soil was undisturbed we had a yield of 3 tons per acre; where all the soil was removed we had a yield of 1.8 tons, almost 2 tons. So the alfalfa will do very well on this subsoil because it needs the minerals that in this subsoil. I just slipped this in to give you an idea of what can happen when surface soil is eroded off. The surface of the soil of course contains the main plant nutrients, and if you remove that there is no question about it reducing crop yields.

Senator STAMBAUGH: It would be interesting to know what happens if you grew grain on there after the alfalfa crop had been in for a few years.

Dr. RIPLEY: We did that. It does help. The alfalfa in addition to growing on the subsoils does improve the soil texture. It is a legume crop and capable of taking nitrogen from the air, but it does improve the soil. This 10-year average of barley crop was obtained after an alfalfa crop. In a 10-year period you do not bring back an eroded soil to normal production by any cropping methods. It can be done but it takes a longer period than that. It is true that the alfalfa, in addition to growing well on this subsoil improves the subsoil itself. It is one of the best crops you can grow to protect soil from erosion. Any grass or legume crop is good protection.

Senator BARBOUR: This soil must have been very deep in the first instance or you would not have been able to grow as much as you did.

Dr. RIPLEY: It has been farmed for a couple of hundred years and has been subject to normal rotation, and some fertilizer has been applied of course. It is not a particularly rundown soil, it has been farmed normally.

Senator TAYLOR (*Westmorland*): Would that be a heavy clay subsoil?

Dr. RIPLEY: No, the Grenville soil is a limey soil, fairly deep down.

Dr. STOBBE: It is a limey soil and has lots of lime in the subsoil.

Senator BARBOUR: I suppose that is the reason they never had to use any lime on it.

Dr. RIPLEY: Yes.

Now, I will move along: Most of the erosion in eastern Canada is caused by water, as I point out here, and I thought it might be interesting just to pick out a few local areas where erosion has occurred. It occurs of course all over the country but we have had quite a considerable amount of erosion in the central hilly part of Prince Edward Island. Some of you will be familiar with that area. One of the bad areas in Nova Scotia is in the Annapolis Valley—it is hilly, and, again, fairly heavy rainstorms occur occasionally. There was one rainstorm in 1942 which deposited 7.9 inches of rain in four days, and there was terrific flooding and erosion in that one particular rainfall. In Cumberland county, in Nova Scotia, around Nappan, the erosion is rather bad too, because it is quite hilly. In New Brunswick most erosion occurs in the Saint John River Valley. Here a lot of potatoes are grown. Of course that is a row crop and not all planted on contour, so there is a considerable loss there. A few years ago some people took samples of silt out of the Saint John River for several months and determined the amount of silt that was in the Saint John River and they estimated that in one year 1.5 million tons of soil is flooded away in the Saint John River.

In Quebec erosion could be very serious in the eastern townships in southern Quebec, but fortunately they keep it in grass quite a lot. That is the crop that is grown mostly—hay and pasture. In June, 1943, 9.31 inches of rain was received in one rainfall, 4 inches in one 24-hour period. I used to live in Lennoxville on a farm there, and at Lennoxville and Sherbrooke four or five rivers converge and these flooded their banks and millions of dollars of damage was done by deposition of silt from these rivers on good farm land all around that region.

In Ontario of course we all know about the National River close to Ottawa, flooding and washing away soil; the Etobicoke and the Humber River in the Toronto area, the Ganaraska River around Cobourg, and the Thames River and their flooding. Flood and erosion seem to go together. In Manitoba we all remember the 1950 flood when the Red River and the Assiniboine River overflowed and flooded the city of Winnipeg.

There is a considerable amount of water erosion in the Turtle Mountain area in Manitoba and in the Riding Mountain up further north, near Dauphin.

In Saskatchewan water erosion is very excessive, especially in the Cyprus Hills and Wood Mountain area and also up further north in the St. Louis and Hagen areas, around Melfort and in that area.

In Alberta the Peace River area is one of the notable erosion areas where considerable erosion takes place.

In British Columbia, up around Smithers, in the northern part, there is quite a bit of erosion, and then of course in the Fraser River Valley, particularly in the delta of the Fraser there is a great deal of it.

Senator HIGGINS: Would you point out the location of the Fraser River Valley.

Dr. RIPLEY: It empties right near Vancouver, and flows from the north right back almost as far as Prince George.

Wind erosion is not as serious in eastern Canada. We have a little in New Brunswick, Ontario and Quebec but it is not extensive except on the very sandy soils, and in some cases on the mucky soils where vegetable crops are grown fairly extensively. There is a considerable amount of water erosion in the Prairies. Those of you who know the Prairies will recall the dust storms of the thirties in the Melita and Boissevain areas, in Manitoba, and there were also some in the Dauphin area. There has been wind erosion in Saskatchewan around Regina, Biggar, St. Louis, Watrous and Swift Current,

and there has been some around Lethbridge and Calgary in Alberta. Wind erosion is also found in the Peace River area of Alberta. There is very little, if any, in British Columbia.

This covers some of the erosion as it takes place in Canada. It is still difficult for the soil surveyors to estimate what damage occurs. We know there is erosion but just to give it a dollars and cents value is almost impossible due to our farming conditions, particularly in eastern Canada where erosion is not as bad as it is in some other countries, particularly the southern United States.

Farming and land use conditions change over a long period of years and under improved conditions erosion can be halted and land which has been eroded can be improved and brought back into relatively good production. This has probably taken place to a considerable extent, especially in eastern Canada. There are 672 million acres of total land area in eastern Canada and of this, 429 million acres or 64 per cent is forested. Forests give fairly good protection to soil from the standpoint of erosion, and this in itself is good land use, provided the forests are managed properly.

I have tried to divide the crops grown in eastern Canada into what I call the "Erosion Prevention Crops", the "Intermediate Crops for Erosion Control", and a third group I call the "Poor Erosion Control Crops." There are 42,684,142 acres of farm land in eastern Canada. Of this area 28 per cent is in farm woodlots; 9 per cent in wild pasture; 16 per cent in improved pasture and 18 per cent in tame hay. These are all erosion prevention crops and make up 71 per cent of farmland area in eastern Canada.

Of the crops which are in the intermediate for erosion control group I have put tree fruits which make up .3 per cent, small fruits .1 per cent, wheat .2 per cent, oats .6 per cent, barley .3 per cent, rye .02 per cent, mixed grain .3 per cent and flax .04 per cent, a total of 1.86 per cent.

In the poor erosion control group we have listed corn for grain 1 per cent, corn for silage .9 per cent, potatoes .6 per cent, soybeans .6 per cent, tobacco .3 per cent, vegetables .4 per cent, buckwheat .2 per cent, summerfallow 1 per cent, field beans .1 per cent, root crops .1 per cent, and other fodder crops 1 per cent. This is a total of only 6.2 per cent of the area in eastern Canada.

So you can see that there is a more or less natural measure of control in eastern Canada because of the cropping systems used. I should mention that this does not quite total 100 per cent, if you happen to add these up, and this is because of the fact we have not included a few crops such as sugar beets and small-acreage crops, and we have not included farm buildings, lanes, and so on.

Senator TAYLOR (*Westmorland*): Why did you put buckwheat in the second group rather than with grains?

Dr. RIPLEY: Buckwheat is a short season crop, for one thing, and usually the land is exposed during quite a bit of the growing season so that it is vulnerable to erosion. Buckwheat does not give quite as good a cover as some of the other grain crops. I can see where there might be some doubt in your mind.

The CHAIRMAN: It is a short-stem crop?

Dr. RIPLEY: Not altogether a short-stem crop but it is not a leafy crop; that is to say, it is a rather stemmy crop. It has a broad leaf but in my opinion—and I may be wrong—it does not give the same cover as a crop of oats would.

Senator TAYLOR (*Westmorland*): The buckwheat we grow in New Brunswick is, for the most part, the Japanese variety and it is very bushy and leafy. You only sow about two-thirds of a bushel to the acre and it grows up like a tree and the leaves on it give good protection.

Dr. RIPLEY: It does while it is there but we plant buckwheat about the end of June and harvest it at the end of August. It does not cover the ground for as long a period of time as does oats, which are seeded a month or more earlier.

Senator TAYLOR (*Westmorland*): But it is generally seeded down the same as grain, oats and barley. You usually sow grain and grass seed with it.

Dr. RIPLEY: I believe that in Ontario they hardly ever seed down with buckwheat, although I know they do in the Maritimes. It does not amount to very much anyway. It is just .2 per cent of the total land area in eastern Canada. When we get to Western Canada, however, we find the situation is quite different. The total farm land in the three Prairie provinces is 126,696,191 acres. Of this acreage the fairly good soil erosion control crops show wild pasture occupying 24 per cent of the land, woodland 5 per cent, improved pastures 2 per cent, tame hay 2 per cent, and other fodder crops .5 per cent, a total of 33.5 per cent. That compares with the total of 71 per cent for these crops in eastern Canada.

Crops intermediate for erosion control occupy a total of 33.51 per cent. Wheat occupies 18 per cent of the land, oats 7 per cent, barley 6 per cent, rye .3 per cent, mixed grain .2 per cent and vegetable crops .01 per cent and flax 2.0 per cent.

Under the groups of poor crops for erosion control are listed corn for silage .2 per cent, potatoes .04 per cent, rape .3 per cent, buckwheat .05 per cent and summerfallow 19 per cent, a total of 19.41 per cent.

A much greater proportion of the intermediate and poor erosion control crops are used in the Prairie provinces, and these crops make the potential for erosion considerably greater, and summerfallow during the whole year and grain crop areas during the part of the year are exposed particularly to wind erosion damage. There is considerable water erosion too in various areas.

I have mentioned this not to indicate that I think we have water or wind erosion under perfect control, but our systems of farming in Canada generally, particularly in eastern Canada where we have so much grass and good cover crop, are such that the erosion problem is not as serious as it is in countries where cotton and corn are grown in large areas such as in the United States.

In western Canada where a large area of 22 million acres of summer-fallow gives us a problem, erosion control practices are being set up. Trash cover, strip cropping and cloddy structure of the soil and other measures are being used to control soil drifting. If the farmers would only use these methods, we think we could pretty well control the erosion. They do not use these methods, however, and I expect we will have a constant serious problem of erosion because it is difficult to get everybody to follow the practices which will control it.

Gentlemen, I hope this has given you a picture of the erosion situation and how it is being handled in Canada. If there are any questions I would be glad to try to answer them.

Senator STAMBAUGH: With regard to the statement that farmers are not using these methods, I think that generally speaking in western Canada they are using methods of trash cover and cloddy structure.

Dr. RIPLEY: Many of them are, yes.

Senator STAMBAUGH: It is so much different than it was 30 years ago. When you drive through the countryside you get the impression that a different method of farming is being used.

Dr. RIPLEY: That is true.

Senator STAMBAUGH: I believe the percentage that do not use some measure of erosion control is pretty small.

Dr. RIPLEY: I think that is right. There are very few using a plow, for instance, but not so many have got into strip cropping.

Senator STAMBAUGH: They have a wind problem in the southern part of Alberta and they are practising strip cropping there.

Senator TAYLOR (*Westmorland*): I would like to refer to some of the work that has been done in the St. John river valley, as far as erosion is concerned. At one time I had something to do with the administration of agricultural policies there, and I have seen probably more than one acre of top soil completely gone after a heavy rainfall that came down some of those side hills. I can recall storms that took away all the potato seed and top soil down the river. That has also happened in the region of the Tobique river, in what we call the New Denmark centre. It became very serious, because the area was down into the sub-soil, as in Truro. I have seen it when it has been just like sugar and has dissolved and run away. A number of years ago we started in with a farm management plan and laid out the farms in contours, with various drainage systems, and so on. I recall being in the Grand Falls area at one time, and one fairly large farmer said that after one year of contour planning he would not take \$5,000 for the plans that had been laid out on his farm. That gives some idea of the work that was done. Whether it has been continued, I do not know. In that potato belt, potatoes are planted in the soil for two or three years in a row, and the fibre has gone out of the soil. They simply had to do something about it, and now they are plating on the contours, and so on. This has been a very serious problem, and probably still is.

Dr. RIPLEY: Yes, it is still a problem, and they are still working on it. In other provinces they are doing similar work. The Ontario people have done quite a considerable amount of work in planning farms; the same in New Brunswick. Saskatchewan has a soil conservation unit in the provincial government; and they are doing quite a bit of work around St. Louis and Hagen—there is quite a development there. I should like to see more of it, but I think we can be very well satisfied that with the information available on erosion control, both wind and water erosion, gradually farmers are taking it up.

Senator TAYLOR (*Westmorland*): I think farmers in those areas are pretty conscious of the fact that something has to be done.

Dr. RIPLEY: Yes.

Senator HIGGINS: I presume that erosion has not yet become a very serious problem in Canada, from what you have stated in your brief.

Dr. RIPLEY: As I say in the third paragraph of the brief, "In the opinion of most of the soil surveyors it is serious but not alarming." I do not know if that is a good statement or not.

Senator HIGGINS: I believe it has become a very great problem in the United States, has it not?

Dr. RIPLEY: In the New England states, and states where they have mixed farming, and there is a lot of grass, the situation is about the same as in Eastern Canada.

Senator HIGGINS: I am referring particularly to the Missouri valleys. Many years ago they started to grow Chinese elms there. What is the position now, have those elms grown?

Dr. RIPLEY: I do not think I can answer that because I have never been in that area, and I suppose I have not kept up with my reading.

Senator HIGGINS: Terrific dust storms came from there and went as far as Boston and New York. That has never happened on the prairies when there have been dust storms, has it?

Dr. RIPLEY: Well, it travels fairly far. In the thirties the dust from storms travelled quite a distance.

Senator STAMBAUGH: It used to go from Lethbridge to Winnipeg, anyway.

Dr. RIPLEY: Yes, and further south too. It not only affected that area between Winnipeg and Lethbridge, but went north, though not too far. In Northern Canada, I suppose 200 miles from the border drifting is not bad. However, it is bad in Montana, and in the north-central states it just about shuts out the sun, and you would think it was almost night time.

Senator STAMBAUGH: I was thinking of what happened in Canada. It was even worse when you got down south of the border in Dakota and parts of Montana, and most of Minnesota.

The CHAIRMAN: Do you find any difference in soil erosion due to the different types of soil?

Dr. RIPLEY: Yes, quite a difference. As far as water erosion is concerned, clay soils—sometimes we refer to them as heavy soils—water does not permeate them or soak into the soil, but it will run off the surface. The heavy clay soils are the ones that erode badly. Of course, water runs into sandy soils and does not run over them. The opposite is true of wind erosion. It is the fine sandy soils mostly that are affected by winds. The cloddy structure of clay holds it so that it does not drift as much.

Mr. STUTT: With regard to water erosion, is silt one of the biggest features?

Dr. RIPLEY: Yes, silt and clay affect the water erosion, of course.

Mr. STUTT: The two together?

Dr. RIPLEY: Yes. They make a very packed soil and the water just cannot get into it, and if water starts running over the surface, then of course that is where erosion starts.

Mr. STUTT: One can pretty well pinpoint erosion by silt and clay?

Dr. STOBBE: That is a question of soil type in land use.

Dr. RIPLEY: If you have a clay soil that is covered over it is pretty well protected. Right along, if you can keep a cover on of forest or grass, a cover of any kind, it is going to protect any kind of soil, really, but there is a difference between soil types and their erosion potential.

Senator STAMBAUGH: Along with the type of soil is the question of the amount of rainfall?

Dr. RIPLEY: With water erosion it is not a question of the total amount of rain. You can get 30 or 40 inches of rainfall or precipitation during the year and may not have any erosion at all. In June 1949, in Ottawa, where we were able to measure run-off, we had one rainfall of three inches in about an hour, I think it was, and in that one hour it took off 66 tons of soil per acre. It is heavy, intense rains that really cause the damage and give you the erosion, mainly. If that three inches had fallen even over a 24-hour period, we would not have had nearly as much, although we would have had some. However, it is these very heavy, intense rains that cause most of the erosion.

Senator HIGGINS: You mentioned that there is no wind erosion in Newfoundland. Is there enough farming to cause any erosion at all?

Dr. RIPLEY: There is not very much. I think less than one per cent of the total land area in Newfoundland is farmland.

Senator HIGGINS: It is very hilly country, and even water erosion is nil. I was fishing in a river on the west coast once, and a very heavy rainfall ran down through the valley; it rose about six feet and there was no erosion at all.

Dr. RIPLEY: No; our soil survey did not record any erosion at all. The whole agricultural land was listed under non-erosion or slight erosion, which means practically no erosion.

Senator HIGGINS: Are they allowed to cut down trees from the banks of rivers at the mainland?

Dr. RIPLEY: You are getting into forestry now. I do not know what is allowed and what is not allowed, but there are some regulations. I am not sure enough to answer that.

Senator HIGGINS: Very few of our rivers in Newfoundland have trees on their banks.

Dr. RIPLEY: I think that is right.

Senator HIGGINS: Which shows that the most important thing is to have trees around.

Dr. RIPLEY: Well, it is a big help.

Senator TAYLOR (*Westmorland*): It may be interesting to the committee to know that while I was in Scotland a few years ago as a delegate along with the Canadian Federation, at which time I attended the I.F.A.P. in Sweden, I met a farmer in Scotland near Ayrshire. His farm was known as the "Rotten Row" farm; and we were out in a pasture that was on a fairly steep slope of a hill. I told him that I presumed that the first consideration in that part of the country was good cattle, good livestock, for successful farming, to which he replied, "No, our first consideration is soil. We underdrain all our soil." I said, "You don't mean to say this field here is underdrained?"; to which he replied in the affirmative. I asked him why. He replied that it was underdrained in order to hold the water as it comes, and that by under-draining the soil down to three feet it becomes a sort of sponge that holds the water, otherwise the rain comes and all runs off and they don't get the benefit of it. I have not heard of that done in Canada to the same degree. I do not think we take the same interest in our soils that they do in the Old Country.

Dr. RIPLEY: I think that is pretty true of Canadian farming generally. We have not had to take care. In all the European countries, their farms are not as large as ours, but their yields are much higher, partly due to good management, partly due to better climatic conditions, of course; but our farmers have not been pressed to really get right down and do a good job of farming.

Senator SMITH (*Kamloops*): Dr. Ripley, you mentioned the percentage of farm land that the country has as a whole. What is it?

Dr. RIPLEY: It is about 6 per cent, I think, of the occupied farm land—it is 6 per cent of the total land area of the whole country.

Senator SMITH (*Kamloops*): What percentage of the land in Newfoundland is capable of being used?

The CHAIRMAN: Senator Smith, this is covered pretty well in the next brief we are going to hear. You will be able to discuss that point with our next witness. Is that agreeable?

Senator SMITH (*Kamloops*): That is fine.

Dr. RIPLEY: We are working on the production of an erosion bulletin, which I hope very shortly will be available.

The CHAIRMAN: Honourable senators, I would like to say in passing that Dr. Ripley has a new title. He is now Director of Soils. When he appeared before us in 1958 he was Chief of the Field Husbandry Division.

We will now hear from Dr. Stobbe.

P. C. Stobbe, Director of The Soil Usage Institute, Ottawa, Ontario:

Mr. Chairman and honourable senators, at the present time I am Director of the Soil Usage Institute. However, my remarks will be based on my association and my experience with the Canadian Soil Service over a period of 25 to 30 years. During that time I have had opportunities to visit and to examine soil in almost every county in eastern Canada and perhaps to a less extent in western Canada but I have been on various study trips in western Canada so I am familiar to a certain extent with the soils there. A great deal of what I have to say today probably has already been told to this committee. In view of my background and my training and my special attention to my study of different kinds of soils perhaps my approach to what I have come to say and what has been said to you before might be a little different.

First of all, I would like to say that the soil service organizations across Canada—ad I am using the word “organizations”—are engaged in a co-operative program in which we have federal and provincial units working together, and thus we have a number of organizations all co-ordinated through Ottawa.

The CHAIRMAN: It covers all of Canada?

Dr. STOBBE: Yes. We are not as active at the present time in some provinces as in others. For instance, in Newfoundland we have been most unfortunate that for the last two or three years we have not been able to find men to direct the work there. But otherwise we are active and our organization covers all of Canada.

To date the Canadian soil survey organizations have covered about 250 million acres of land, and that has meant different types of soil surveys. Some of them are done in detail, some of them are reconnaissances, and some are on a rather broad basis. Now, these 250 million acres include about 85 per cent to 90 per cent of our improved farm land in Canada. According to the census figures we have about 100 million acres of improved farm land, of which we have covered about 85 per cent to 90 per cent, and that means that there are still about 10 million acres of improved farm land which have not been covered to date by any kind of survey. It also means that we have covered considerable acreages of land that is not improved farm land, woodlots or in many cases not occupied by farms at all. This generally was done in settled areas but we have also covered some woodlots that are not settled at all at the present time, in order to get an estimate of our soil potential.

Now, if we look at our figures of improved farm land—I said it was about 100 million acres, we find that our acreage of improved farm land has been increased, between 1951 and 1956, by about 3 million acres, so we are still on the upswing.

However, if we look at the individual figures, by provinces, we find that in eastern Canada there has been a considerable decrease in the acreage of improved farm land: In the Maritimes, for instance, this decrease, since 1911, has been 36 per cent of the improved farm land. In Quebec the decrease has been about .04 million acres and in Ontario, 1.1 million acres since that same date. This decrease has taken place even though there has been considerable development of new land in Quebec and in Ontario. One might ask why does this situation exist, why this decrease? Well, if we look at our soil survey maps we find that almost invariably the lands which have been returned to forest, which have been abandoned, are low quality lands, land that produced some

crops and some food at a time 50 to 100 years ago when people were clearing the land and were getting revenue from forest products. However, as our society and our economic conditions changed, the produce from this land could not compete on the market with produce from better land and consequently there was no alternative in many cases but for people to leave the land.

Now, it is true that in many cases there are other factors, social and economic factors, such as roads, schools, distance from markets, all have an important bearing on this situation.

From the soil survey information obtained to date, one may estimate that at least 5 per cent of our improved farm land is just as poor in its productive capacity as the land that has already been abandoned. A lot of land use of this land at the present time is undergoing a change, and we can be almost certain that sooner or later these lands also will be abandoned.

Now, it seems to me that instead of encouraging people to stay on poor land of that nature one should encourage and perhaps assist them to leave such land. In many instances such land is left to reforest itself or to regrass itself under natural conditions. This is very often a slow and costly procedure and I think that in many instances this could be expedited, if some facilities or some organization or some provisions were made that would assist people to reforest or regrass such land.

About 10 per cent of our improved agricultural land, our occupied agricultural land, consists of excellent agricultural soils. These soils have a good natural fertility, they hold moderate amounts of moisture, they have a good topography and are well drained. They are not subject to erosion and are free of stone. In other words, under reasonably good management these soils will produce good yields of the crops adapted to the climatic conditions. In general, these are the soils against which all other soils have to compete on the market. That is a very important point, for many people do not realize that there is this question of competition of produce from different soils.

We think that 5 per cent of the soil should be reforested, and we say that 10 per cent consists of excellent agricultural soils. This means that 85 per cent of the soils represent a great range in productivity levels and a wide variety of problems in land use. This 85 per cent includes some of our better soils that could be considered as first-class land if devoted to specific land use, that is, to a specific crop to which they are adapted or best suited.

For example, I might refer to some of our tobacco soils which could be considered as first-class land if devoted to the production of flue-cured tobacco. However, if they are not used for flue-cured tobacco they are poor-producing lands due to low fertility, organic substance, erosion, and so on. So the question arises as to how this land that is not suitable for tobacco should be used. There have been instances where the land has been reforested and it is excellent for growing pine. Should a farmer continue to farm this land on an unproductive basis with the hope that some day he might possibly grow tobacco on it, or should he reforest it?

We know that at the present time, certainly,—and perhaps for a long time to come,—we are not able to grow tobacco on all the soils best suited for that crop. So that is a very important question when we discuss land use. Soil is suited for certain things and not so well suited for others. It may be suited for reforestation and someone has to decide locally on the spot what is the best use to make of this land. At the present time a large percentage of it is just a problem to us.

A somewhat similar situation but to a less degree is that of the orchard soils in Quebec. Many of the gravelly soils in this area may be considered as first-class soils if used for apple orchards but if used for ordinary farm crops, such as hay and grain, they may only be rated as mediocre soils.

A somewhat similar situation exists in the Niagara Peninsula, where some of the better soils used for stone fruit such as peaches and cherries fall in about the same category. They are certainly first-class lands. In this case, however, the situation differs greatly from the tobacco soils. The extent or supply of our good peach and cherry soils is very limited. Due to their location and due to the fact that these soils also make good building sites, a substantial acreage of these limited first-class soils is annually converted into industrial sites and suburban developments, thus bringing about a very marked change in land use. In other words, every year we are losing considerable acreage of this first-quality fruit land, of which we have a very limited acreage, to rural and industrial development. So there again this range in land use from fruit land to industrial sites and housing developments is very significant when we come to discuss land use and what should be done about it.

Most of our soils are better suited—and this is particularly true in eastern Canada—to one crop than to others. That particular crop may be potatoes, hay, alfalfa, timothy, grain, or corn. We find that the most effective use can be made of the land if it is grown to the crop to which it is best suited.

Over the years many farmers have learned this by themselves and in general, I might say, the land is probably used to its best advantage according to suitability. However, this is not always so and only too often we find that better use could be made of land by growing better adapted crops. When I say this I fully appreciate that due to availability of markets and farm management requirements, it is not always feasible to use land for those crops to which it is most suited. You might have too much of one produce on the market and therefore have to use the soil for other purposes, but on the whole, readjustments in land use could be made to increase efficiency.

Many of the better soils in the 85 per cent group could be considerably improved and turned into first-class land by the installation and application of certain management practices. For instance, some of our imperfect land could be turned into first-class lands by the installation of fairly simple drainage improvements, by controlling erosion hazards, by removal of stone, by liming and by fertilization. Some of our average and good agricultural soils could be converted to first-class soils, and their efficiency of production improved, if these methods were followed. However, the productivity of many of the poorer soils—those in the 85 per cent group—can be raised to the level of the better soils only by intensive and often costly management practices, and even with such practices it is often difficult to raise production beyond average levels.

A great deal can be done by improving the fertility of soils. I would like to cite some examples from our fertility investigations here in Carleton County. With the application of commercial fertilizers in farmers' fields we found that we could increase the yield of silage corn on one of the poorer soils from 3.7 tons per acre to 17 tons with the best fertilizer treatment that we applied. In the case of one of our better soils the increase was from 20 tons without fertilizers to 30 tons with fertilizers. Even with the best treatment the poor soil did not yield as much as the better soil without commercial fertilizers. This tremendous increase of 13 tons per acre on the poor soil cost \$54 per acre or, on the average, \$4 per ton of silage corn. It is obvious that at present prices no one can afford to grow silage corn at \$4 per ton, for fertilizers alone, but it is also obvious that no one can afford to grow corn with yields of 3.7 tons per acre. If one is going to grow corn at all on this soil it would have to be at considerably less than maximum yield. It would have to be at a lower level of productivity. Perhaps around 9 to 10 tons per acre, and at a considerably reduced price per ton. On the other hand, this poor land when used for grass, produced $\frac{3}{4}$ of a ton per acre. With fertilizers we could increase it by more than a ton. If we

increased it to that amount, again the cost was too high. In order to produce this crop most efficiently we would have to apply fertilizer to it and produce less than its maximum productivity level. Using less fertilizer produced less yield at more cost per unit. So when we take this soil, one could produce grass and feed the livestock more efficiently than if one used corn. On the other hand, one might question if one could afford to farm that soil at all. Certainly, you could not afford to grow corn with fertilizer. Grass, even if you raised your yield from $\frac{3}{4}$ to $1\frac{1}{2}$ tons, would still cost about \$4.00 per ton for hay and fertilizer, and it is a question. We have a great deal of this soil in Eastern Ontario and Quebec. Many farmers have reverted some of this land to forest. A large number of them are still cultivating this type of land. I would say that roughly 200,000 acres would still be under cultivation. But here is a question which is not so easily decided, in the circumstances, whether one should recommend this particular soil for reforestation or for other land use—agriculture. That would have to depend on the set up and the local conditions within the community, and on the individual farmer.

I will now turn to the subject of drainage. We have in this part of Ontario and Quebec a poorly drained soil which at the present time is producing poor crops of low quality hay and pasture. Occasionally it is planted to oats or buckwheat, and very often we find only half the field planted and the seed drill stuck in the mud for the rest of the summer. It is obvious that this soil as a good deal of it is farmed is not productive. On the other hand, we have found this same type of soil can be improved, and has been improved. We have some of the same soil on the Experimental Farm, and this is one of the most productive soils we have. Over a period of 30 years it has produced an average yield of $3\frac{3}{4}$ tons of good quality hay per acre under a moderate fertility programme. So here you have a case of soil that might be considered as marginal or sub-marginal turned into the highest producing soil that we have.

I might also say at this time that it is not so easy to drain some of this land, due to drainage outlet, and due to the fact that on this kind of land there is a tendency for the tiles to silt in, and precautions have to be taken. However, in a case of this kind we now have again to decide, are we going to improve this particular land, and it can be improved, at a cost, or should it be taken out of agriculture. It is obvious to me over the long run that no one can make a living and exist on this type of land as it has been used in a large percentage of the cases.

Now, there are other cases where the land is just as poorly drained which is producing about the same as the other poor pasture, where we know that improved drainage alone will not improve the productivity of that soil. Other factors, such as liming, organic matter, a great deal of fertilizer, sometimes removal of stones, all have to be implemented in order to raise the productivity of that soil; and here it is quite obvious with land like that, at least under present conditions, and any conditions that will prevail for sometime to come, it should not be farmed.

We have all the gradations in between these two extremes of soils as far as drainage is concerned. So far as fertility is concerned, we have the same conditions, so I am quoting this just to give you an example that the kind of land that you have must play an important part on what use you make of the soil.

I would like to mention some other conditions where the productive capacity of the soil is changing greatly by tremendous changes and immense efforts we are applying to the soil. In this relation, I would like to mention some of our organic soils. We have a great acreage of organic soils in Canada; a lot of it is waste land, some of it is farmed in an effective manner, some of

it has been considerably improved and farmed well, and some of it is used for industrial purposes. We know that a considerable percentage of this land can be tremendously improved by controlled drainage, and by that I mean drainage and irrigation cultural practices, by liming and fertilizers. By these means some of this cheap and very poor land can be returned to the best and most expensive land that we have. A great deal of this land, I know, is selling from \$1,000 to \$2,000 an acre, and it is worth it as far as producing land is concerned. So here you have a situation where you can change the use of the lands entirely, depending on what you do to them. In most cases, this development is too expensive and too big a job for individual farmers, but it has been done quite successfully by private capital, and they are producing crops on it and competing successfully. In time this development might force changes in agricultural use of some of the other land. Some of the same situation applies to irrigation, where we apply the irrigation to many of our poorer producing soils, thereby changing the productive capacity of that soil, and in many instances changing the soil itself. It stands to reason that we must also change the land use of such soil with such development.

There is another factor which has a great bearing on land use, and which I believe I should mention, and that is the size of the farm. It applies particularly to many of those where at the present time we have problems in land use. We have many farms with soils that in the past have produced good crops, with good management, and at the present time are still productive, if they are managed; but unfortunately many of these farms are not being farmed, or in some cases only partially, and in some cases are only serving as residences for a family that is working elsewhere. At the same time, some of these soils are still quite productive if used properly. In many cases we find either that the unit is too small to give sufficient return to people to stay on the land, or that it is the lay-out of the fields, which is determined by the kind of soil you have. Also, perhaps the soils themselves do not lend themselves to modern farming practices, but are all right where you use a team of horses and where the farmer competes with others who use similar methods, but at the present time the nature of the land and its lay-out is such that it does not lend itself to modern practices. That would suggest that one, two, or a number of these farms must eventually be combined to form a unit that is large enough to operate with modern practices, which might require a number of changes in land use. It might require that some of the poorer soils on these farms could be taken into forests. In that way the crops could be consolidated on the better pieces of land and perhaps other areas might be turned into grass and pasture. In many instances this change in land use can only be put into operation efficiently by increasing the size of the farm.

At present adjustments are going on in our land use and particularly of the type of land included in the lower part of this 85 per cent figure. It is advisable that these adjustments should go on and it seems to me that we should do everything possible to expedite and assist and guide this re-adjustment because it is bound to come. Some of the conditions that have influenced the use of the land that I have discussed might have to be applied.

I would like to say that any changes in the use of the land that we are proposing or suggesting must keep in mind the kind of soil, the kind of land, what the land is suitable for, what can be done with it. In the long run I believe what is best for the land is also best for the people. Very often our land use might be affected too much in an attempt to help the people for the time being rather than to think of the long range view of having the land help the people.

I do not know of a single operation or practice that we could apply to all our soils across Canada. It seems to me that the land and the problems

associated with it have to be studied regionally, they will have to be studied locally, on the individual farm. The solutions to these problems have to be worked out jointly, according to what the problems are, and as I said before I think we should have some provisions whereby we could expedite this thing, whereby we could assist people to get off the land, assist people to settle on the land. It might require financial assistance, and also, no question about it, it will require technical guidance.

Senator McGRAND: Is corn not rather expensive as far as soil usage goes?

Dr. STOBBE: Not necessarily.

Senator McGRAND: Does not the growing of corn involve evaporation and a lowering of water level of the soil?

Dr. STOBBE: No, I do not think so. Corn certainly would not lower a water level so much as alfalfa will.

Senator McGRAND: I read this in a book on conservation,—it said that America gave two curses to the world, and one of them is corn.

Dr. STOBBE: Well, one of the big contributions that America has made has been the production of good corn.

Senator BARBOUR: You say that there 36% of improved land in the Maritimes has gone out of production.

Dr. STOBBE: That is the figure given in the census.

Senator BARBOUR: Isn't there much more produced on the remaining land than there was produced ten years ago?

Dr. STOBBE: I wish that were proved. I have that point covered in the brief. In our estimation we could in eastern Canada double our production if we used the land the way it should be used, and on less land than we are farming now. So actually this poorer land, the land that should be out of production, and some of this submarginal land, contributes very little to the total production. So I would say that there is still enough land that we could improve.

Senator BARBOUR: It is the poor land that is not producing much.

Dr. STOBBE: Yes.

Senator HIGGINS: I might say that I know nothing about farming. I see crops growing and I hear about them. In your brief you did not mention much about the rotation of crops. Are you referring to that when in your brief you say, "These changes are generally most effective when they are accompanied by changes in land use"?

Dr. STOBBE: Yes, rotation of crops is part of our management of soils and of land. We think certain types of rotation are necessary for good soil management, yet you might have other types of farming where rotation does not enter into it so much. If a farmer is carrying on grass farming the only rotation needed there is whenever your grass runs out to get it seeded down usually with a grain crop. In other cases it is very difficult to establish rotation because we do not have too many alternatives in what we can rotate. In some of our best land, for instance, the alternatives are limited. Our farmers have been finding over the years that there is not too much rotation—summerfallow is one method by which you can conserve your moisture.

The CHAIRMAN: Senator Smith, did you have your question answered?

Senator SMITH (*Kamloops*): Yes, thank you.

The CHAIRMAN: If there are no further questions we will adjourn.

Senator TAYLOR (*Westmorland*): Mr. Chairmain, before we adjourn I am very happy to move a vote of thanks to both Dr. Ripley and Dr. Stobbe for their valuable briefs.

The committee adjourned.

JAN 2 - 1963



Fourth Session—Twenty-fourth Parliament
1960-61

THE SENATE OF CANADA

PROCEEDINGS OF
THE SPECIAL COMMITTEE OF THE SENATE

ON

LAND USE IN CANADA

No. 3

THURSDAY, FEBRUARY 23, 1961

The Honourable Arthur M. Pearson, Chairman
The Honourable Henri C. Bois, Deputy Chairman

WITNESSES:

Department of Forestry

The Hon. Hugh John Flemming, Minister; Dr. J. D. B. Harrison, Deputy Minister; and Mr. A. L. Best, Acting Chief, Forest Economics Division.

Department of Fisheries

Mr. S. V. Ozere, Assistant Deputy Minister; Dr. A. L. Pritchard, Director, Conservation and Development Service; and Mr. J. E. Rutherford, Assistant Director, Economic Service.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Higgins	Power
Basha	Horner	Smith (<i>Kamloops</i>)
Bois	Inman	Stambaugh
Boucher	Leger	Taylor (<i>Norfolk</i>)
Bradette	Leonard	Taylor (<i>Westmorland</i>)
Buchanan	MacDonald	Turgeon
Cameron	McDonald	Vaillancourt
Crerar	McGrand	Wall
Emerson	Méthot	White—31.
Gladstone	Molson	
Golding	Pearson	

(Quorum 5)

ORDER OF REFERENCE

Extract from the minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

"The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Bois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—
Resolved in the affirmative."

J. F. MacNEILL,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

THURSDAY, February 23, 1961.

Pursuant to adjournment and notice the Standing Committee of the Senate on Land Use in Canada met this day at 11.00 a.m.

Present: The Honourable Senators:—Pearson, *Chairman*; Barbour, Basha, Emerson, Gladstone, Golding, Higgins, Inman, MacDonald, McGrand, Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon and Vaillancourt.

In attendance: The Official Reporters of the Senate.

Forestry

The following witnesses from the Department of Forestry, presented a brief and were severally heard and questioned:—

The Hon. Hugh John Flemming, Minister; Dr. J. D. B. Harrison, Deputy Minister; and Mr. A. L. Best, Acting Chief, Forest Economics Division.

Fisheries

The following witnesses from the Department of Fisheries, presented a brief and were severally heard and questioned:—

Mr. S. V. Ozere, Assistant Deputy Minister; Dr. A. L. Pritchard, Director, Conservation and Development Service; and Mr. J. E. Rutherford, Assistant Director, Economic Service.

At 1.15 p.m. the Committee adjourned to the call of the Chairman, tentatively set for Thursday, March 2nd, 1961.

Attest

James D. MacDonald,
Clerk of the Committee.

THE SENATE

SPECIAL COMMITTEE ON LAND USE IN CANADA

EVIDENCE

OTTAWA, Thursday, February 23, 1961.

The Special Committee on Land Use in Canada met this day at 11 a.m. Senator ARTHUR M. PEARSON in the Chair.

The CHAIRMAN: Honourable senators, it is now 11 o'clock, so we shall commence our deliberations. This morning we have the pleasure of having with us: the Minister of Forestry, the Honourable Hugh John Flemming; his Deputy Minister, Dr. J. D. B. Harrison; and the Acting Chief of the Forest Economics Division, Department of Forestry, Mr. A. L. Best. Therefore, we shall take the Department of Forestry brief first; and then we shall hear the group from the Department of Fisheries.

However, before we do that, I would like to say I have received word that Senator Bois is ill, and also that Senator Wall has been very ill but is getting better now. I am sure that as your chairman you would wish me to send them our good wishes.

I will now ask the honourable minister to address us. Honourable sir, we are very pleased to have you with us. Perhaps you would first read your brief, and then we shall ask questions.

Honourable HUGH JOHN FLEMMING, Minister of Forestry: Mr. Chairman and honourable senators, at the outset I would like to make an observation or two concerning the fact that in the preparation of this brief we have kept in mind we would have to confine ourselves to general observations; and I would like to assure you, Mr. Chairman and members of the committee, that if the deputy minister and Mr. Best, of the economics division, can be of any more assistance to you, by providing detailed information concerning the activities of the department when it was a part of the Department of Northern Affairs and National Resources, you may consider, Mr. Chairman, that our facilities are entirely at your disposal, and I am sure that you will find the deputy minister's and Mr. Best's knowledge consistent with their appointments.

It is pleasant for me to have the privilege of addressing this distinguished assembly, and as I look down the line and see my old friends Senator Taylor (Westmorland) and Senator McGrand, I am conscious of the fact that this is not the first time we have sat in the same chamber. Our observations and discussions did not pertain entirely to land use but, looking back, those associations were, generally speaking, pleasant.

Senator TAYLOR (Westmorland): We did not always agree.

Hon. Mr. FLEMMING: I have reached the age when I find some pleasure in reminiscing, and I can assure you that the presence of these two senators, in particular, brings back very many pleasant memories, although some of them might have been of a little hectic nature as well.

It is a great pleasure for me to have the opportunity of appearing before this committee. It is a committee which has received much favourable comment and recognition throughout the country, and one whose activities have

been closely studied by officers of my department. So, today I would like to present the views of our department on land use problems as they relate to forestry.

I believe that you, honourable senators, will subscribe to these preliminary propositions—that a nation's basic resource is its land, the living space of its people and the source of its wealth. The way the land is used is not only the result of its natural geographic characteristics; it reflects also man's energy and ingenuity in the pursuit of his goals, past and future. Land use is, therefore, dynamic rather than static, changing in response to changes in population, technology, economics and social values. Each generation re-evaluates its use of the land, making adjustments where possible to bring land use into line with its purpose. However, an enlightened people will ensure that successive policies of land use will agree in one basic respect: that the policies shall be conserving and not degrading, with careful management of renewable resources and prudent husbandry of non-renewable ones.

The nature of this country is such that production of forest crops is a prominent feature of its economy and it seems inevitable that a large proportion of the land area will always be in forest. For vast areas the growing of trees is the only reasonable use that can be foreseen. At the present time, 68 per cent of the land area of the ten provinces is covered by some type of forest growth and the income generated from the use of these forest resources is the largest single component in the Canadian economy.

Might I venture the observation now, Mr. Chairman, that in New Brunswick the percentage of the area that is in forest land is something more than 80 per cent—I believe, about 82 per cent—so you can see that it is of additional significance to our province as compared to the rest of Canada. The percentage in the whole country is 68 per cent. In addition to directly accounting for about 12 per cent of the net value of production of all industrial groups, the forest-based industries support a great host of service and manufacturing industries.

In the field of international trade, wood and paper products have maintained for many years a favourable net balance of trade in excess of \$1 billion. By contrast our trade in all other commodities for the last 10 years has annually resulted in an unfavourable net balance of trade ranging between \$1 to \$2 billion. In other words, Canada's very livelihood is dependent upon our ability to produce and place in world markets forest products at competitive prices.

A day or two ago I read an article put out by the Canadian Manufacturers' Association in which they said that if you ask the ordinary citizen of Canada what was the greatest single item of export from this country, 99 out of 100 would answer wheat, but actually it is not wheat. It is newsprint. There are about twice as many dollars worth of newsprint exported from Canada as there are wheat. So I mention this in passing, because it does emphasize what I am saying as to the importance of forestry and the forest resources.

Forest Land Tenure:

A large proportion of Canada's forest area is unproductive from the standpoint of producing economically usable forest products, although such lands do serve other purposes, such as protecting water catchment areas and providing habitat for wildlife. The productive forest area covers 28 percent of the land area and may be divided into two major land tenure classes—occupied and unoccupied. The occupied forest consists mainly of privately-owned lands and Crown lands under lease or licence; it makes

up approximately 184 million acres, or less than 10 per cent of the total land area. Naturally the harvest of forest products is taken from these occupied forests.

Of particular significance as a source of forest products are the privately-owned forest lands. A great deal of information has been presented before this Committee on farm woodlots and their significance in the economy. I believe it is necessary to emphasize the fact that all private forest lands should be taken into consideration, and not just those attached to farms. Our studies of forest production from private forest lands in eastern Canada indicate that only between one-third and one-half of all owners of small forest properties are classed as farmers.

Generally speaking, the private forest lands are the most accessible, the most productive and the most adaptable to intensive forest management of any forest lands in Canada. They are capable of continually producing annual harvests of wood products at low cost; in fact, some areas in the Maritime Provinces have been under a continuous high rate of production for over 150 years with no apparent adverse effect on the forest cover. However, because of their very accessibility, these lands are under constant pressure for conversion to the many alternative land uses associated with a developing economy. It is imperative that these private forest lands be maintained as producing forests if Canada is to successfully compete in the future world markets. Forestry can no longer be considered secondary or inferior—a last resort land-use, to be adopted only when all alternative possibilities prove uneconomic.

II—Problems in Forest Land Use:

I will now mention just a few of the many land-use problems which exist in the most accessible forest areas of Canada. We are well aware that in certain localities there is a slow though continuous shift in land tenure with a corresponding shift in land-use. Private lands are being expropriated by governments and other agencies in connection with national defence programmes, and to fulfill the needs of a growing population for parks, recreational areas, roads, etc. Crown lands are also being alienated for colonization and agricultural purposes. In most cases little or no regard is paid to the forest potential which is usually destroyed or drastically curtailed by these changes.

Another problem which is becoming more prevalent each year involves the changes in ownership of the small forest holdings with a resulting decrease in the output of timber products. For instance, a large number of properties comprising thousands of acres in aggregate have been purchased by absentee owners solely for recreational purposes, with no thought given to the cutting of forest products. Our studies to date indicate that usually the maximum forest production from small private lands is only obtained when their owners live on or near their properties, enabling them to operate on a continuous basis. This situation reflects the growing pressure for recreational land which has developed close to large urbanized areas both in the United States and Canada.

Representations have already been made in relation to the marginal and sub-marginal farm, the latter defined from an agricultural point of view. It should be pointed out, however, that in many cases these so-called sub-marginal farms are used as country homes by families whose employment and income are from non-agricultural sources. Many of these properties are used as a base from which small but efficient forest properties can be managed. Any large-scaled programme to move people from this type of farm holding could create social and economic complications. Efficient woods labour required

by industry is often obtained from areas in which there are numerous farms of this type. Also, intensive forest management is facilitated if practised on a small scale and by people living on the land and with an intimate knowledge of local conditions. The marginal and sub-marginal farm areas should be thoroughly analyzed from all the various aspects before any irrevocable decisions are made or programmes initiated.

III—Multiple Use of Forest Lands:

The value of land is increased when it is used for more than one purpose, and forested land is properly valued not only for its timber production but also for its use on a continuing basis as a source for water, forage, wildlife and recreation. As the forest crop is growing, the soil is stabilized and maintained against erosion by the protective layer of litter and humus that forms beneath. The importance of this surface cover in slowing run-off, preventing flash-floods and sheet erosion, in keeping streams clear for recreational purposes and in preventing silting of storage basins, is perhaps better appreciated by the public than any other single aspect of the natural environment. We still have a long way to go before the full meaning and significance of multiple use—that is over-all conservation with optimum development of integrated resources—is assimilated in our social philosophy. Meanwhile leadership by example will be provided wherever problems of land use are approached, by the co-operative effort of the various resource fields, within this broader frame of reference.

In the provinces, various conservation agencies and boards are working on problems of integrated land use: their goal, the restoration and development of resources in the interests of the general public. The Department of Forestry recognizes the importance of this work and, for example, is itself participating in a newly initiated research project in Alberta on watershed management, in co-operation with the Eastern Rockies Forest Conservation Board and with other Departments of Government. Here the intention is to study the inter-relationships of the twin resources, forests and water, in the interest of rational land use, at the sources of the streams that water the Prairie Provinces.

IV—Department of Forestry:

Within the contemporary pattern of land use, the Department carries on a research program aimed at assessing, maintaining and enhancing the productivity of forest land through studies of the biology of native and introduced tree species, selection and breeding of superior varieties, protection against fire, insects and disease, development of suitable silvicultural and management practices, maximum utilization both at the stump and in the mill, and improvement in the competitive position of the forest industries at home and abroad.

Witnesses appearing previously before this Committee have stressed that land classification within the limits of timber-producing areas is as important as it is in differentiating land for its major uses. With this we agree, and the federal forestry organization has a history of research on "site classification" going back more than 30 years. Detailed ecological knowledge of forests and land provides the fundamental basis for a planned, continuing forest industry. To differentiate areas of high productivity from the medium and the low; to match the plantation to the appropriate soil; to determine what cultural practices are at the same time both productive and conserving of the land itself: these are as important to forestry as they are to agriculture. The future need for high yields of forest products at low costs dictates that the best possible use be made of areas that rate high in accessibility and in potential productivity. Research in such areas is recognized as being of prime importance.

Site studies have found practical application in many facets of forestry. For example, some pulp and paper companies in eastern Canada have made use of developed techniques for purposes of differentiating forest-production types as well as for engineering purposes such as road location. At present, research in this field is continuing from British Columbia to Newfoundland, and limited experimental mapping of forest land is being done to complement the well-developed techniques of tree-cover inventory. Liaison is maintained with the National Soil Survey and with provincial forestry organizations, some of whose research workers, such as Mr. G. A. Hills of Ontario, have pioneered the field.

V—Future Needs:

There seems to be a natural tendency, inherited from the past, to treat forestry as the Cinderella sister of agriculture, leaving it with the sub-marginal and marginal left-overs and the mismanaged land. Yet in terms of the efficiency by which solar energy is converted into materials, and in the actual quantities of materials produced, forests are superior to most agricultural crops. Quality of products must, of course, be considered in putting a value on production, but in times of rapidly changing technology this is not easy to predict. What is certain is that forests are highly productive crops, the more so the better the land on which they are grown (climatic conditions being favourable). Therefore, it is not wise to automatically evaluate land for forestry use by the criterion of agricultural non-suitability. It is well to remember that degraded land may only produce poor forests, which will prove to be of little value to either the agriculturist or the industrialist.

Traditionally, the question of conservation is separated into various fields: forestry, soil, wildlife, water, etc. This separation is, of course, artificial; what is done in one field influences all others. For example, it is naive to plan river development without also planning forest management. The most fruitful approach to conservation places each region, or each local area, as a geographic "whole" or system within which vegetation, climate, land and water interact with man and his cultural activities. In this frame of reference the objective for each area must be to provide the greatest yield in improved quality of living for mankind.

Fundamental to the study of the ecology of areas, and underlying all rational land use, must be a knowledge of the land itself: its physical make-up of topographic form and sub-surface composition, its skin of soil, vegetation and adhering climate. The value of soil classification has long been recognized in agriculture, both as an inventory of a resource and as a basis for farm planning. Much more, should an inclusive land classification that integrates information on soils and forests with physiography—an inventory of land in terms of those properties which relate to potential use—be considered of national importance and of immediate concern to us all.

Under a "market-oriented" economy, land use is strongly influenced by the foreseeable future demands for resources. Thus beyond the question "What are the inherent potentialities of the land?", there is the problem of balancing the various possible uses of the land at the local, provincial and national levels so as to best meet expected requirements. The steeply rising demand for forest products in the world markets indicates that forestry must continue as a major land use and, in the light of forecasts of Canada's economic prospects, must merit increasing attention. Integration of forestry with agriculture may, through healthy diversification, help to alleviate the chronic distress of the latter industry.

The need for an understanding of the ecology of areas follows from the recognition that renewable resources are integral parts of the larger, dyna-

mically balanced environmental system. Therefore, forestry research must not be narrowly confined to the trees alone, but must also be concerned with establishing the place of the forests in the national economy, for the general well-being of the people. It follows then, that policies of land use should not be conceived as narrow choices between agriculture and forestry, or between forestry and recreation, but should be directed to the provision of an optimum habitat for man.

Thank you, Mr. Chairman, and honourable senators.

The CHAIRMAN: Thank you, Mr. Minister. The points mentioned in your presentation seem to me to fit in very well with the study which we made last year of rural developments.

Are there any questions, honourable senators, that you would like to put to the minister?

Senator HIGGINS: You said that the occupied forest consists mainly of privately-owned lands and Crown lands under lease or licence and it makes up approximately 184 million acres, or less than 10 per cent of the total land area. When you say "total land area" do you mean the whole area of Canada, or just the area of the forest lands?

Mr. BEST: The total area of Canada.

Senator HIGGINS: Have you any idea how many acres there are of forest land? Has that ever been calculated?

Mr. BEST: Yes, there is a total of one billion acres.

Senator McGRAND: You said that some areas in the Maritime provinces have been under a continuous high rate of production for over 150 years with no apparent adverse effect on the forest cover. Are you referring there to the farm woodlots, or to privately-owned lands?

Hon. Mr. FLEMMING: I think we are referring to privately-owned lands. In general, as you know, there has been some criticism of the fact that in New Brunswick our Crown lands have not been cut really as hard as they needed to be for their good health.

Senator McGRAND: But this would not hold true for most privately-owned land in the province?

Hon. Mr. FLEMMING: Do you mean that it has taken away the forest cover?

Senator McGRAND: I mean that there has been a tendency on farm lots in New Brunswick, especially in those areas which we call the back settlements, to overcut, or cut more than the annual production. Do you not think that is true?

Hon. Mr. FLEMMING: That is true. In my personal experience, when we would see a certain lot, say of 100 acres, which we would know about, we would say: "Is not that a terrible shame that this is cut so hard?" We felt that way about it, and then we found ourselves going back ten or fifteen years afterwards to find it being cut again. In my own experience that has happened many times. I do not think we are conscious, even those of us who have been in the business, of the power of the soil to reproduce trees.

Senator McGRAND: That is not the problem I am talking about. I am speaking of these farmers who are in rather unfortunate situations when faced with high taxation. I believe that the costs of municipal government are going to go higher, with a subsequent increase in municipal taxation. These people have a difficult time to maintain themselves on the land, and they keep cutting and cutting that woodlot until it is depleted. There are farms in New Brunswick which have been sold for taxes, and which no one would buy for the amount of taxes owed because the woodlot had been destroyed.

Hon. Mr. FLEMMING: The Deputy Minister was speaking this morning about Sweden. There is control in Sweden on the size of tree. The state allows only a certain size of tree to be cut, even on privately owned land. Perhaps Mr. Harrison would like to elaborate on that.

Dr. HARRISON: With respect to the point the senator has brought up, there are certainly examples of woodlots which have been cut far too heavily because of the economic difficulties of their owners. Sometimes, of course, the land itself is very poor. The areas that the minister mentioned do exist, but, unfortunately, they are not universal.

With respect to the system of control in Sweden I should point out that the land is very mixed up. If you look at a map of Sweden you will see that a piece of it is state forest, another piece is farm forest, and the next piece is owned by industry. However, the whole is accessible, and it is under control. There is in Stockholm the Royal Forestry Board, as I think it is called. But the authority for seeing that the law is carried out is delegated to a series of what you might call district boards. The chairman of the board might be appointed by the Government, but I do not think that he is in all cases, and on that board are representatives of the private owners, perhaps the state forests and the industrial forests. They require that nobody shall clear or remove forests entirely without permission. They always have required that people shall not cut immature trees without permission. That permission is pretty hard to get. The control is local, so that if somebody misbehaves and cuts, say, 50 cords off land which carries trees only 35 years old, then the fellow on the ground is the fellow who reports him; and, consequently, there are very few infractions. These boards have their own foresters, but the whole community is, in fact, watching the forest resources. It has to be borne in mind that those same people have been on that land for several hundred years, and that is all the land they have. They all know they have to keep the forests up. It is an attitude we will reach in time, I hope, but it has just grown right into those people. If my neighbour cuts part of his forest in the way he should not, then that is of concern to me, and that means less employment in my district. It is a very remarkable feature.

The CHAIRMAN: What about taxation on forest lands in Sweden? Do you have any figures on that?

Dr. HARRISON: We have the information, but I cannot give it to you out of my head.

Senator EMERSON: I would like to ask a question as to what percentage of the 68 per cent of land that is forest is accessible for use today, how much is soft wood, and how much is hard wood.

Mr. BEST: Out of a total productive area of one million square miles, 726,000 square miles are considered accessible right now.

Senator EMERSON: What percentage is being used?

Mr. BEST: The ones that are being used would amount to about 287,000 square miles.

Senator EMERSON: In other words, it is around 300,000 square miles that are not being used or are not accessible at all.

Senator TAYLOR (*Westmorland*): I can verify what has been said. I happened to be in Sweden and Finland in 1949. As a matter of fact, I have been in forests there where you could see a tree had been cut, and there was a white mark on the stump. The inspector goes through and puts two white bands around a tree. That is the authority to cut, and when it is cut it must be cut between those two white bands. If there is a stump or felled tree found without the white bands on it, then the owners are prosecuted. Furthermore, if there is a tree blown down or a tree that he cuts, then every twig

must be taken out, even down to the size of your little finger. You find in these farm wood lots wood piles that are composed of small little branches, down to the size of your finger. They have no forest fires there or, at least, they had not had many when I was through the forests of Sweden. I would like to verify what the minister said, and also what Senator McGrand has said. I think it is true, as the minister said, that large areas of privately owned land pretty well take care of themselves. I have a piece of land that I have owned for some years, and in my lifetime it has been clear cut four times. It is almost ready to cut again. What the senator has said is that it is the small farm woodlot owner who is pressed for income of some kind, and, therefore, he cuts it every year, in the winter, and cuts wood that should not be cut at all, even for pulpwood. It is practically ruined. I do not know how you can overcome that.

Senator McGRAND: May I follow that up, and deal with this very type of problem? Those are people who have a tendency to get discouraged and finally they leave the land and look for a job somewhere else, wherever there is work. I notice that the minister said:

Any large-scaled program to move people from this type of farm holding could create social and economic complications.

That is a thing I have had in my mind for years, that something must be done to retain these rather marginal lands, to keep them in use and to keep the people living there. Every year unemployment seems to go up, and it has always occurred to me that the cheapest place you can feed, clothe and house people is on the land. If you are going to have a permanent unemployment situation perhaps the use of these marginal lands is the way to keep some of these people employed, by keeping them there instead of having them go into the city with all the expenses that involves, the subdivisions, housing, sewage and all those things which go towards providing them homes; and they are unemployed people living in the subdivisions of cities.

Senator STAMBAUGH: Even with some sort of subsidy.

Senator McGRAND: Yes, that is the thing I have always felt. In the rural areas of New Brunswick—and there is no one more familiar with that province than the present Minister of Forests—I am thinking of such communities as Biggar Ridge and Forest, where the land is gone over and the forest growth is cut and they are gradually shrinking.

Hon. Mr. FLEMMING: You mean the people are leaving?

Senator STAMBAUGH: Yes.

Hon. Mr. FLEMMING: They have to get to the town where there is a little more excitement; and that has a little to do with it.

Senator BARBOUR: Suppose a man has 100 acres of forest, not virgin forest, but forest that has been cut over each year, what income could he expect annually per acre from that forest?

Hon. Mr. FLEMMING: That is a difficult question to answer.

Senator BARBOUR: Approximately?

Hon. Mr. FLEMMING: We have lots of figures on the approximate growth and, of course, it has to be a variable figure because it is not uniform. Generally speaking, it works out that a farmer, if he is using that 100 acres of wood lot in conjunction with his farming, will work a system by which he will do certain cutting in certain areas this winter and others the next one, and by the time he gets over the 100 acres he will probably be able to come back and start where he started previously. But to say how much in dollars that contributes to his income is quite difficult. In New Brunswick I have listened to Dr. Gibson, of the University of New Brunswick Forestry School, and different ones who more or less theorize on the annual growth. I think

the pulp companies are always trying to improve their annual increment of forest land, but speaking broadly and generally I think they consider that if they get one-fifth of a cord per acre per year they are doing quite well. Dr. Harrison says they can do much better in a good many cases. In theory, you can translate that into dollars, if you wish. However, in practice, it is quite difficult to put a dollar amount on it. You have the figure of one-fifth of a cord, and if a cord is worth, say, \$4 that is 80 cents; and if you have 100 acres it runs to a considerable amount of money.

Senator McGRAND: In the University of New Brunswick they have about 3,000 acres of forest land. The work being done there indicates that the growth per acre supervised is about three or four times what it is on land that is not supervised.

Senator BARBOUR: At the bottom of page 7 of the brief you say:

Yet in terms of efficiency by which solar energy is converted into materials, and in the actual quantities of materials produced, forests are superior to most agricultural crops.

Hon. Mr. FLEMMING: You do not agree 100 per cent with that, Senator Barbour?

Senator BARBOUR: No, I do not.

Senator HIGGINS: Mr. Minister, may I look at the matter in little broader terms. Forests are looked on from various viewpoints: for instance, the pulp and paper companies look on forests as areas to be cut down to get pulp; sportsmen look on them as resorts for wild life, for the preservation of water, as a sanctuary; and economists look on them as a place in which the balance of nature should not be disturbed, that erosion of the soil might not be caused by the cutting of trees too close to a river bank.

The same broad view would apply to rivers. A river is important according to your occupation or your avocation. The pulp man looks upon it as a waterway on which he may drive logs; the sportsman looks upon it as a place for fishing; the engineer looks upon it as a source of electric power.

My question is, have steps been taken to reconcile these various points of view? Is anything being done to prevent the paper companies from cutting trees too close to the bank of a river, thus causing erosion and spoiling the land, or to prevent engineers from taking over rivers, which would otherwise provide a means of transportation for logs, and for fishing, and use it for the development of electric power? I understand that once a river is dammed, that is the end of the salmon in it. Is anything being done to preserve the salmon?

Hon. Mr. FLEMMING: Dr. Harrison has had long experience, Senator Higgins, and I would ask him to answer your question. I doubt very much that a serious attempt has been made to reconcile these things.

Dr. HARRISON: Mr. Chairman, in terms of reconciling by any over-all authority, I think there has been rather little done in Canada. It would be rather pessimistic to say that nothing has been done.

Referring to your remark about the pulp companies looking upon the forests as areas to be cut down, I can assure you, Senator Higgins, that most companies nowadays are working under plans that provide for orderly cutting and eventually for the regeneration of the lands cut over. Such plans are required by the provincial governments. I think it also true to say that the pulp companies I know—and I know a good many of them—are working the forests on what they call a sustained yield basis. For one thing, they are being required to do it, and they now realize that they must, if they are going to keep their huge investment in mills as a valid operation.

As to the multiple use idea, may I give an example of two interests? A representative of the Department of Fisheries is here, and he will know what I am talking about. I refer to the large spraying program carried on against the spruce bud worm in the province of New Brunswick, and which is participated in by Canada. There was an emergency, and something had to be done to prevent the loss of the fir trees in New Brunswick and the leaving of a fire hazard, a condition that one hardly dares think of.

In the early stages of spraying, it indicated that it would keep the forests green, but unfortunately the infestation is not entirely clear yet. It was also found that with the spray technique being used damage was being done to the fish. Therefore, investigations were started and it was found that spraying could be done with reasonable efficiency in the forest with half the load of DDT, and the damage to the fish according to later reports has been reduced to a very small proportion. That is now being carried out as a co-operative effort between the departments and other agencies concerned. As a matter of fact, there is a standing committee which has examined the results from time to time, and the latest reports are very encouraging.

I take it that is the sort of co-operation and mutual thought you are thinking about Senator Higgins. I think one could go across the country and find a good many examples of that sort of cooperation. Certainly, in some provinces timber may not be cut within a certain distance from a lake, say 400 feet.

Senator EMERSON: Mr. Harrison, is New Brunswick the only province now being sprayed?

Dr. HARRISON: It is the only large scale operation at the present time in which we are participating. I believe it is the only one.

Senator McGRAND: May I ask Dr. Harrison to elaborate on the question raised by Senator Barbour, as to the statement that in actual quantities of materials produced, forests are superior to most agricultural crops. I have always been under the impression that the better land was along the rivers, and it has been used for agricultural purposes, while soil in the forest areas as a rule was inferior and not suitable for agriculture.

Senator TAYLOR (*Westmorland*): Mr. Chairman, before that question is answered, may I follow up the observation made by Senator Higgins?

I think it is all too true, and I am sure the Minister will agree with me, that in the province of New Brunswick, for instance, when a road is being rebuilt or realigned, the engineer sees nothing but a highway. There may be beautiful trees along the road area, but it means nothing to the engineer. There seems to be very little co-relationship, as Senator Higgins suggests, between these various interests. I am receiving a flood of letters from people in British Columbia in connection with the Columbia River project, where there is considerable conflict of interest between agriculture, fisheries and power. As far as I have been able to learn, there has not been very much co-operation in Canada with a view to getting various organizations together and agreeing that certain things should be done to protect the natural resources.

Dr. HARRISON: May I comment on that, Mr. Chairman?

I think this concept, in fact this need for, as it were, a joint approach to the resources development in a geographic area such as a river basin was probably one of the chief objects in the Government's mind when it announced the conference on "Resources for Tomorrow" to be held next October. I know the discussions that have taken place have called serious attention to this question, and it is hoped that this conference will be at-

tended by interested people representing various disciplines from all over Canada, and will come up with some ideas that will enable us to plan more wisely for the future.

Senator TAYLOR (*Westmorland*): There is certainly great need for it.

The CHAIRMAN: Mr. Minister, you wish to make a statement with respect to Nova Scotia.

Hon. Mr. FLEMMING: Mr. Chairman, and gentlemen, I don't know whether the provinces generally have a statute which restricts the cutting of timber on private land, but I know that Nova Scotia has such a statute, called the Small Tree Act. That Act regulates the cutting even on privately owned land. I recall that some 15 or 20 years ago its administration was rather difficult to start with; it met with some degree of resistance. However, at the present time people have settled down and have accepted it, and in the main I believe it has been a very successful statute. I cannot speak from personal experience with it, but I have heard of its use on a good many occasions.

Senator McGRAND: How does that statute affect lumbermen who go into the woods with a bulldozer to make a wide road, and who smash down trees, big and small, with no regard for destruction of the cover? Is there any regulation of that type of activity in Nova Scotia?

Hon. Mr. FLEMMING: No, I do not think that particular angle is contemplated in the legislation. It is directed more to the restriction of cutting to a minimum-sized tree. I believe that the cutting of smaller trees is influenced by what we might call greed. I am sure experience shows that from a dollars and cents point of view, a man would be as well or better off if he did not cut undersized trees; and from the point of view of future generations, they would definitely be much better off if the trees were allowed to develop.

The CHAIRMAN: Dr. Harrison has the answer to a question asked about the quantity of trees being cut per annum. I would ask him to enlarge on that now.

Dr. HARRISON: I think one honourable senator asked a question about the sentence: "Yet in terms of the efficiency by which solar energy is converted into materials, and in the actual quantities of materials produced, forest are superior to most agricultural crops". That sentence refers only to the quantities of materials. It is a fact that the tonnage of useful material, such as cellulose, produced by forests, exceeds the tonnage of the ultimate yield from many agricultural crops. I believe the minister's purpose in having that sentence there was to illustrate, not necessarily that a cubic foot of wood is worth more than a bushel of wheat, but that the capacity for growing materials by forests was very high indeed.

The CHAIRMAN: May I ask a question with regard to the products of the forests? What can our economy stand in the way of moving out into bigger business and larger areas of production in the case of pulpwood and paper, for instance? Can we stand a great expansion in that field?

Dr. HARRISON: There are two things involved in that question, Mr. Chairman, and one is the forest potential—what can our forests stand without being destroyed. If they are well managed and well protected—and those two "ifs" are critical—we can produce far more wood than we have ever cut on a perpetual basis—in other words, forever and ever.

The CHAIRMAN: If it is accessible?

Dr. HARRISON: That brings in the economic factor. I would say that even the forests that are accessible today can produce more wood than they have ever done in the past if we can afford to give them a more intensive management.

You spoke about marketing. There is no question in my mind about the possibilities of expansion in this field if the forests are given good management, and so forth. The rate at which we can expand will be governed by the international market, and that becomes a subjective judgment at any given moment. For example, many references have been made to the report of the Fowler Committee which expected an enormous increase in the world demand for paper and paper products within 15 years from now. At the moment our industries are not running to capacity, and new capacity is being installed all the time. If my memory is correct, I think last November we produced more newsprint than we had ever produced before, and yet we were not running to capacity. I think it is fair to judge that this is a temporary situation, and that all of this capacity is going to be used, and much more.

Senator EMERSON: I would like to ask the minister a question with respect to hardwood. What percentage of our forests is hardwood, and what percentage of that is being used and what percentage is not being used?

Dr. HARRISON: If you take the hardwoods together then a small percentage is being used, but it is increasing.

Senator EMERSON: We are not making use of our hardwood in the way they are down south. We are meeting a lot of competition from the south in our paper products. I was wondering what was being done with regard to hardwoods in this respect.

Dr. HARRISON: We are using them, but it is only a fraction at the moment. However, their use is growing. The mill at Hawkesbury is running almost entirely on hardwood, I understand. It depends on the products you are making. If you have near the mill a nice stand of softwood in an accessible place, and a nice stand of hardwood, then you are going to use the softwood instead of the hardwood.

Senator EMERSON: What is the percentage of softwood as compared with the percentage of hardwood? Do they exist fifty-fifty?

Dr. HARRISON: With respect to softwoods in the larger sizes—that is, big enough to make into saw logs—the figure is 291 billion cubic feet—as against 54 million cubic feet for the hardwood.

Senator HIGGINS: When you refer to hardwood in the east do you refer to birch?

Dr. HARRISON: Poplar, birch and maple are the main ones.

Senator HIGGINS: Is birch the main hardwood?

Dr. HARRISON: I have not the figures offhand, but I would think in the east birch, including white birch, would be in the largest quantity. There is a great deal of maple, some of it good and some of it no good. The birch, of course, is split between the yellow birch and the white birch, and the differential in value between those is very great indeed. We have had tremendous losses in those species in the last few years, due to disease.

Senator EMERSON: How about the lumber industry? Is that decreasing very much throughout Canada?

Dr. HARRISON: No, the total production of lumber is holding up very well. Of course, about two-thirds of it is in British Columbia.

Senator EMERSON: And is it being used in Canada or is it being exported?

Dr. HARRISON: Offhand, I would say about half of our lumber goes out of the country. Yes, about 50 per cent is exported. Many mills in the east have had to put up with much smaller logs than they used to.

Senator EMERSON: The larger percentage of the forest is where—is it on the west coast of Canada? Is the largest percentage of the forest industry in, say, British Columbia, or is it in the east?

Dr. HARRISON: About 15 per cent of the paper output is in British Columbia, and the rest is in the east. On the other hand, I think about 60 per cent of the lumber produced is in British Columbia, and, of course, a huge proportion of the plywood produced is in British Columbia. It depends on the product.

Senator EMERSON: And the production of plywood is growing very fast out there.

Dr. HARRISON: It has grown very fast, but the industry is having troubles right now.

The CHAIRMAN: I would like to thank the minister, the deputy minister and Mr. Best for the very fine brief, and the answers which they have supplied to us. There are many more questions which can be asked, but we must get along with our work here. Is there any other particular question which any honourable senator wishes to ask the minister before he leaves?

Senator TAYLOR (*Westmorland*): On behalf of this committee, Mr. Chairman, I would like to move a vote of thanks to the minister, to Dr. Harrison and to Mr. Best. I would like to say also, Mr. Chairman, that although I have not always agreed with the minister, I do agree with him on this subject.

The CHAIRMAN: We will now hear a presentation by the Department of Fisheries, and Mr. Ozere is here representing that department. I will call on him now to introduce his assistants, and also give us a little background with respect to himself.

Mr. S. V. OZERE, Assistant Deputy Minister, Department of Fisheries: Thank you, Mr. Chairman. First of all, honourable senators, the minister sends his regrets at not being able to be present on this occasion, but his multifarious duties and activities over the last few days prevent his being here. It is also regretted that our deputy minister is away in London, England, at the present time on urgent business. Therefore, you will have to put up with what is left of us here.

I understand that this committee is principally interested in getting the facts. That being the case, it is sometimes better to get them directly from the horse's mouth than getting them secondhand. I have with me two people who are principally qualified to discuss the subjects this committee has assigned to us—the relationship of the fishing industry to the farming industry; a review of the effect of other industries on the fisheries.

In connection with the effect of other industries on fisheries we have with us Dr. A. L. Pritchard, Director, Conservation and Development Service, who spent the earlier part of his life in doing research work in fisheries, and who is now the head of the Conservation and Development Service of the department. He has held that post for the past 12 years, and without a doubt he is the most qualified man in Canada to deal with this subject. So, if there is any supplementary information required, in addition to what has been included in this brief—which, incidentally, was also prepared by these two gentlemen, I will only have the honour of reading it—he will be able to answer those questions.

In so far as the other side of the assignment, the relationship of the fishing industry to farming, is concerned, we have with us Mr. Jack E. Rutherford, who has spent the better part of his life with the Department of Agriculture as an economist, and who has been for about 10 years with the Department of Fisheries as assistant director of the economic services. Having been with the two departments he is very well qualified to deal with all aspects of this subject.

So, Mr. Chairman, without any further ado I shall read the brief.

The CHAIRMAN: Thank you very much, Mr. Ozere.

1. A REVIEW OF THE EFFECT OF OTHER INDUSTRIES ON THE FISHERIES:

It can be stated that insofar as Canada is concerned, any industry which uses water in any way or affects the water supply, will influence fish in one way or another. The reason lies mainly in the fact that the country is favoured because almost every body of water supports fish of one kind or another.

In assessing the seriousness of the impact, it must be recognized that a fish is a moderately, highly-organized cold blooded animal which is very delicately balanced with its environment. Conditions outside the fish directly control the amount of activity in every phase of the life history. Any extreme influence such as a major change in temperature will directly bring about an immediate change in the activity. In this respect, fish are not like warm blooded animals which have a built-in mechanism to control their body temperature and thus the speed and extent of their reactions.

It does not necessarily follow that every change in environment is the result of the operation of other industries. Nature itself exhibits such changes, sometimes to the benefit of fish and sometimes to its detriment. Climate changes may limit production. On the other hand, changes may make conditions better and thus increase production. As an example, we have just passed through a long-range variation of Atlantic Ocean temperatures which has had the effect of moving the centre of cod production farther north. With a colder cycle now beginning, it is moving south. One may also have sudden floods due to heavy rain. These will occur normally without any interference from man and may do great damage.

Unfortunately, however, mainly because of lack of appreciation of the true facts of the situation, man-made changes at the present time are more often detrimental than beneficial. It is encouraging, however, to note that in recent years more real interest and appreciation is being shown as the fish populations are exposed to heavier pressure and in some instances becoming scarcer. Even though the reaction is somewhat late, it is a hopeful sign for the future.

The influence of other industries may be direct or indirect. In the first place they may act on the fish itself through the discharge of direct poisons. In the second place they change the environment and introduce conditions making it unfavourable for reproduction and life of water inhabiting species. In either case depletion is inevitable unless something is done to counteract the effects. Examples from each industry will provide suitable illustration of the problem.

In a country such as Canada where secondary industry is growing at a relatively fast rate, its effect must be considered at the moment as most dangerous to aquatic forms. In this growth there is increasing demand for water which, as a matter of fact, appears to be reducing the supply. To date this reduction has not been serious from the point of view of the fishing industry but there are indications that with lower supply, temperatures have risen and with movement of large amounts from one area to another, certain species are finding it difficult to survive. At the moment perhaps of more importance is the fact that industry generally may neglect to take precautions to see that fish are not sucked into machinery and other areas where they cannot survive.

In addition, every industry must in some way discharge its effluent. When this is done without control the fish are put into contact with direct poisons such as cyanides from plating, phenols from oil refineries, chemicals from

pulp mills and so forth. In addition, organic waters from industry and domestic sewage, although they may have no direct effect, certainly have an indirect influence in using up the dissolved oxygen in the water and rendering it an uninhabitable medium. One remembers the pollution of the North Saskatchewan from a chemical plant in Edmonton, the heavy pollution load in the Lower Fraser River in British Columbia, the contamination of rivers in the Yukon from a silver mine and the unfavourable conditions in many areas from the discharge of pulp mill effluent. Even the so-called inert solids do have a physical effect of blanketing the spawning beds so that the oxygen bearing waters may not circulate over the eggs.

Much has been written about the effect of hydro-electric developments on fish. This is to be expected in a country such as ours where the main fisheries, e.g. salmon on the Pacific coast, depend to a great extent on anadromous species, i.e. fish which spawn in freshwater rivers and live in the sea. Any barrier in the stream stops the adults from migrating up-stream to spawn, floods out the spawning ground, creates reservoirs with different current patterns from the natural rivers and hinders movements. They also set up conditions which make it difficult for the young fish to migrate to sea without mortality.

Poor practices in agriculture have certainly had effects. Recently, of course, there has been great improvement with such methods as contour plowing, but any treatment of the ground which permitted silt to flow off into the rivers has gradually ruined streams for fish. This is particularly noticeable in the areas which have been settled for the longest period, e.g. southern Ontario. The recent trend towards the use of larvacides and insecticides to control parasites has undoubtedly resulted in fish mortality. One can think of "accidents" with parisgreen in the potato growing areas of the Maritime provinces and many others. Recently reclamation projects not thoroughly considered from the viewpoint of fish have caused trouble.

In the case of forestry, there is no doubt that poor logging practice has exerted an influence. It is obvious that if brush is not cleared from rivers the essential migration of spawners will be stopped. There is another relationship perhaps less clearly demonstrated but nevertheless active, in the complete denuding of an area which includes water courses. This procedure removes the possibility of holding the water and results in flash floods which have a tendency to destroy stream bottoms to the detriment of spawning and the living conditions for smaller aquatic forms on which the fish depend for a living.

In moving the timber from the forests to the mills in many areas log driving is used in one form or another. Any time that such a drive takes place, the bottom will be disturbed and damage will result if eggs or alevins are still in the gravel. In addition, large booms usually result in the deposition of bark on the bottom. In the disintegration of this material oxygen is used up and is not available for fish. The bottom becomes covered and the spawning gravels clogged. In some cases in the disintegration quantities of hydrogen sulphide develop. The result is that when this disintegrating material is disturbed, heavy mortality of the fish in the vicinity can take place.

In recent years there has been a great use of insecticides to control forest insects. There is no doubt that these, often selected without reference to fish and aquatic insects, have found their way into streams and resulted in heavy losses.

In mining the type of influence can be either physical or physiological. In placer mining, which occurs in many parts of western Canada, the removal of gravel has the effect not only in removing the spawning gravel but when the gravel is washed the fine solids drift downstream and clog the areas below. Of serious import also is the effect which results from the discharge of wastes.

The most extreme and evident cases are obviously those involving inert solids which in some cases are of such quantity that lakes are completely filled. On the other hand, there is no doubt that the liquid effluent may contain chemicals which are deadly. Mortalities have resulted from pumping out old mines in the Miramichi area and there are usually serious losses when cyanide escapes from the refining process.

The oil industry generally might be thought to have very little effect since most of it is carried out on land somewhat removed from streams. In recent years, however, there has been a tendency to explore in regions under water. This has been carried out through seismic surveys which involve detonating charges of various sizes. Unless controlled such operations can have a very serious effect on the local population of fish. It is obvious that the discharge of oil or oil products into waters frequented by fish will result in mortalities. The oil itself will coat the gills and respiration will be impossible. In the refining industry a number of by-products may result which are extremely detrimental. Of these probably the most important are phenols.

One would assume from this brief review that if the country is to develop, the picture is very bleak for fish maintenance. It should be stressed that this is short-term view. It will be bleak only if no real thought is given to the developments. There are methods of controlling the extent to which fish may be affected. Undoubtedly, such control costs money but it would appear in most cases to be justified from any point of view. If control cannot be exerted it would only seem reasonable to consider as a liability against the new industry, the value of the resource which is being destroyed. In many cases if this were added, it would make the new industry non-economic from the broad general point of view. On the other hand, if the costs of control were considered the industry might still be in a position to justify the new development at least from the viewpoint of the general welfare of the whole country.

In most cases this can be accomplished as shown by numerous examples. The pollution in the North Saskatchewan River was limited by a very simple method of lagooning the wastes. The discharge of phenols from oil companies can be controlled. There is the outstanding example of one oil company which as a demonstration raises fish in the effluent which is discharged from the refinery. Forestry practices can be easily modified. In British Columbia great strides have been made and in most other provinces damage has been reduced, by keeping the streams clear of debris and in some cases by restricting the area of logging to leave forest cover around headwater lakes. In agriculture at the present time every effort is being made to operate in such a way as to retain the water on the land. This, of course, cuts down silting. In the case of power development, methods of moving fish are being devised and alternate methods of propagation which do not interfere with the development are being investigated. Pollution from industry can be controlled if the effort is made.

It should be remembered that fish are really experimental animals insofar as water use is concerned. Their reactions will indicate the quality of water to a large extent. While it is true that most water for human consumption is treated, this treatment will be difficult and in fact impossible as the original water becomes too highly polluted. The effect on fish which has been demonstrated is therefore a warning. It certainly indicates that every effort should be made by other industries which need this resource for their operations to use it wisely and insofar as possible to return it to the streams in a condition where it is useful either for human consumption or for other animals which are completely dependent upon it.

2. THE PRIMARY FISHING INDUSTRY IN RELATION TO THE FARMING AND FORESTRY INDUSTRIES AS A MEANS OF LIVELIHOOD

A. Introduction:

Not infrequently, popular articles appear describing the working and living conditions of persons and families located in various parts of Canada and pursuing two or three occupations in the primary industries of fishing, farming, forestry and trapping. For the most part these articles deal with case studies, each case selected because of some unique and appealing feature of the operation related to techniques, methods, conquest of handicaps and so on. Only a few planned economic and social studies of multi-occupational activities based upon the aforementioned primary resources have been carried out. The generalizations that can be drawn from these are limited in application both as to area and as to time.

In this presentation, we provide certain information available from a national Census of the fisheries undertaken in the years 1951 and 1952 and follow this by excerpts pertinent to the subject from several published studies and reports. Based upon the analysis of these materials, we offer certain conclusions for your consideration.

B. Measurement of Inter-relationships in Occupations in the Primary Industries:

Measuring the significance or importance of the derivations of individual livelihoods from more than one occupation is by no means a matter of simple accounting. Attestation to this will be readily forthcoming from anyone receiving income from several sources who has struggled to complete an income tax form.

In the fishing industry, the employer-employee relationship and occupational status of persons engaging in primary fishing activities make it extremely difficult to describe, let alone define, the occupational status of individuals. The usual meaning attached to the word "fisherman" in respect to its use as an occupational description is that of a person engaging in the activity of catching fish. The term "fisherman" includes all those from the operator of a small rowboat used in inshore or freshwater fishing to the skipper of a large trawler. Within this range the trades or occupations in fishing enterprises may encompass sharesmen, cooks, engineers, and other specialized categories.

The head of the enterprise was the focal point in the enumeration process of the 1951/52 census. Information on earnings from activities other than fishing could be obtained only for those other activities in which the head of the enterprise engaged, i.e. farming, forestry and other pursuits. Thus the interrelationships which it is possible to establish between the sources of income for those in the primary fishery do not necessarily reflect the situation for employees, i.e. sharesmen.

In the Canadian primary fishing industry a considerably greater proportion of the labor force falls in employee status than it does in farming. Referring to Table I, it is noted that nearly half the labor force in fishing are employees. In contrast, in farming about 35 per cent are employees, but of the total labor force in farming, only 15 per cent are paid employees.

TABLE I

Percentage of Total Labor Force in Fishing having
the Occupational Status of Employees

Newfoundland	52.5
Nova Scotia	40.4
Prince Edward Island	48.5
New Brunswick	46.1
Quebec	37.7
Ontario	64.4
British Columbia	44.3
Total ¹	47.4

¹ Excludes Prairie Provinces and Northwest Territories.

TABLE II

Percentage Distribution of the Fishermen's Income by Sources
(Heads of Fishing Enterprises) 1951/52

	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Prairie Prov. & N.W.T.	B.C.	Canada
Receipts from the Fishery ¹	73.6	80.5	84.4	78.8	60.7	86.0	62.6	89.9	79.7
Farming ²	7.7	11.2	3.9	9.0	17.8	4.7	27.5	0.8	7.7
Forestry ³	8.5	2.2	2.1	3.2	7.8	0.2	2.7	2.8	3.8
Other Labor	10.2	6.1	9.6	9.0	13.7	9.1	7.2	6.5	8.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

¹ Gross receipts from fishing minus wages, crew shares and crew provisions.

² Includes sale of farm products, value of home-grown products consumed in household and agricultural labor earnings.

³ Sale of forestry products only.

The analysis produced in Table II supports the contention that primary fishing is a relatively specialized occupation requiring the major attention of the head of the enterprise. This, of course, is a general conclusion and within each of the regional situations given in Table II undoubtedly there would be a wide range in the degree of dependence on fishing in contributing to income. Despite the age of the data, the national and regional patterns of relative rankings by sources of income are not far from what one might expect to find today. If anything, one might guess that the degree of dependence on fisheries has increased and that the proportions of income from other primary industry sources has declined. This latter expectation of a decline does not apply, however, to income from "Other Labor". Reasons for this belief are given later.

Another approach to measurement of the importance of income-producing activities is by way of an analysis of the numbers reporting receipt of income from other sources. A summary of the analysis of the 1951-52 Census data based upon this approach is given in Table III.

TABLE III
Percentages of Heads of Fishing Enterprises Reporting
Income from Sources Other than Fisheries, 1951/52¹

	Nfld.	N.S.	P.E.I.	N.B.	Que.	Ont.	Prairie Prov. & N.W.T.	B.C.	Canada
Sale Farm Products	12.7	8.6	14.3	12.3	19.3	14.6	25.6	4.0	12.5
Farm Labor	4.2	0.6	3.6	2.0	5.0	5.2	6.0	1.6	3.1
Farm Products									
Home Consumed	78.1	40.7	39.3	55.6	57.1	15.6	41.9	17.4	51.9
Sale Forestry Products	71.1	31.3	33.9	39.7	39.2	7.3	42.3	13.1	43.4
Other Labor	52.3	48.4	45.5	50.3	50.5	41.7	35.5	35.6	47.1

¹ The percentages shown are not additive because the categories of income source are not mutually exclusive.

The situation revealed in Table III again is reasonably close to expectations. However, it does reveal a more extensive participation in certain other income producing activities than would be concluded from reference to income received data only. While the value of home-grown farm products consumed (treated as an item of income) represented a little less than 4 per cent of gross earnings of heads of fishing enterprises, over half of them reported this item. Sales of farm products reported by 12.5 per cent of the fishermen contributed about the same amount, less than 4 per cent to gross earnings. As an activity, forestry ranks importantly with over 40 per cent of those enumerated reporting income from the sale of forest products. But in the total Canadian situation receipts from this source constituted less than 4 per cent of gross income.

C. Factors Affecting Development of Combinations of Occupations:

The incidence and extent of combinations of occupations in the primary industries is determined by the type of major primary enterprise, the quality of the physical resources and the alternative and off-season opportunities for engaging in pursuits other than the chief enterprise. For fisheries, the type of major enterprise as a factor has importance in relation to the length of season over which it extends. For example, in the Atlantic region, deepwater fishing by the larger vessels is a year-round activity. Persons employed in this type of fishing have not the time to engage in other activities. There has been an increase in the amount of offshore fishing over the years and for the ground-fisheries this increase is expected to continue. The larger vessels have greater mobility and are able to shift as required by changes in navigational conditions, e.g. formation of ice, rough water and so forth, and as needed by changes in the location of stocks of fish desired, e.g. migration, depth of fish, density and state of the stock. Crews of deepwater vessels tend to settle in home ports of the vessels and do not as a rule acquire tracts of land to use for farming and forestry operations.

In some fisheries, the season is extended by opportunities for vessel operators and for members of fishing crews to shift from one species type of fishing to another. These situations prevail where there is almost an unbroken succession over the season of species fished. This is found, for example, in salmon, herring and halibut fishing on the Pacific Coast and fishing for ground-fish, lobsters and herring in the waters off western Nova Scotia and south-eastern New Brunswick. Under these circumstances a considerable proportion of fishermen are busy at their basic occupation for major part of a "fishing year".

The type of fishing enterprise in which he engages limits the fishermen's opportunities to participate in other occupations. This is particularly so in respect to farming. The normal seasonal period for fishing activity is related in part to the habits of the species of fish and in part to regulations that need to be imposed on the fishery. There is a relation between these two factors, of course, and regulations may be such as to prohibit or reduce fishing activities at a time propitious to the conduct of agricultural or other operations. But in general, the times of the year in which climatic and other conditions are good for fishing are times also when certain activities must be carried out in agriculture, such as, for example, seeding and harvesting operations. And if it be livestock operations, even more vital is the attention necessary in matters of breeding and production. There are exceptions to this matter of time conflicts, of course, and winter fishing activities are not as generally time competitive with agricultural operations. However, the winter fisheries are competitive with forestry and trapping activities.

The quality of the physical resources available for use to obtain income supplementary to that received from the chief source is a factor comprised of several elements. If the resource is land for agricultural use, the degree of fertility, ease of working, moisture supply and so forth, have to be taken into account. For forestry resources, some of these as well as other criteria apply.

Of primary importance is the existing market or the market potential for the products harvested. The closest market is the fisherman himself and members of his family. That he is exploiting the market reasonably fully for farm and garden products has been shown already (Table III) in that over 50% of the fishermen reported a value for use of home-produced farm products. This ranged from about 16 per cent of the fishing enterprises in Ontario to over three quarters of those in Newfoundland. But there are close limits to realization of substantial income increases from this source. In a day and age of commercial operations, there is not much room for gain in the material content of living standards by subsistence activities. Thus market potential must be looked at in terms of the opportunity to dispose of an adequate volume of products at a remunerative price.

A glance at the geographic distribution of the Canadian fisheries relative to land resource quality, this quality including market opportunities, readily shows why the combinations of fishing and farming are on the whole not an important means of livelihood. Many of the important fishery resources of Canada require that fishermen locate in areas where the land resource is poor. These areas are usually considerable distances from markets and transport facilities are unsatisfactory. Again, in other fisheries where activity is concentrated, where catches are landed at major ports and where there is continuity of fishing over the season, fishermen choose to reside in or on the outskirts of urban communities.

Levels of earnings from sale of forest products also are associated with location of fishermen. Forestry product sales as a source of income are of importance in Newfoundland and Quebec only. However, the importance of total forestry activities in relation to fishermen's earnings generally cannot be measured from the Census data because labor earnings (wages) from wood-cutting are included with "Other Labor". No doubt, earnings from this source would be important also in the two provinces previously mentioned and in addition in Nova Scotia and New Brunswick.

Alternative opportunities for obtaining labor earnings from other than the primary industries are, given normal economic conditions, mainly a matter of location of the fisherman. Urban areas with industrial development and fair levels of construction activity of various types provide sources of employment in off-seasons or during periods of lull in fishing operations. It is to be noted that "other labor" earnings provide a higher proportion of the

income than any other non-fishery activity. Evidence available indicates that labor earnings as a source of income for those engaging in the primary fishery have gained increased importance over the years since the Census.

D. Selected Comment from Special Studies and Reports:

Substantiation in general of the foregoing facts is found in several of the reports in which particular attention was given to the combinations of fishing with other activities. The pertinent excerpts from these documents are reproduced.

A report on fishing in Prince Edward Island¹ contains the following statement:

The relation of fishing to farming deserves special mention. A casual observer may easily receive the impression that these two activities are very frequently combined in Prince Edward Island. Only a few of the (places listed on Chart 8)² fishing centres are actually fishing communities—that is, places where fishermen live the year round and where the predominant occupation of the inhabitants is fishing. Aside from Rustico, Tignish Run, Miminegash and a few other centres, the location (shown on Chart 8)² are fish landing places rather than communities of fishermen. The fishermen who use these landing places usually live around through the surrounding country and many of them have sufficient land to raise food for family use, but relatively few engage in farming on a commercial scale. The legal seasons of the lobster fishery are coincident with the period of heavy activity for farmers. In the area from North Cape south and around to Victoria on the Northumberland Shore, the open season is from August 10 to October 10 and farmers would be busy harvesting and preparing for harvest during those two months. Over the rest of the Island, the legal season is from May 1 to July 1 and this is the seeding period for farmers. In those cases where a lobster fisherman owns a farm of commercial size, we may be sure that someone else—a son perhaps—is actually doing the farming. A true combination of farming and fishing sometimes occurs in the fisheries for oysters and smelts. Oyster culture on a small scale may frequently be incorporated as part of the farmer's usual activities and may not necessitate any special travelling if the farm fronts on a warm water inlet suitable for oyster growth. Smelts are also caught in the inlets and at a time of year that is relatively free for farmers—the late fall and winter. Consequently, farmers can engage in smelt fishing with little disturbance to their farming occupations. Aside from these two cases, however, farming and fishing in Prince Edward Island are, in the main, distinct and separate occupations.

In an earlier study³, detailed records were obtained from 39 households in Cape Breton County in which farming and fishing were combined as sources of family income. Of these 39 families there were 22 which did not produce any agricultural products for sale. Seventeen families did sell farm products, but the average value of such sales during the year of the survey was \$29.00. The report contains the following comment:

There is a strong combination of factors acting as deterrents to agriculture, the soil is in small pockets and lacks humus, the growing season is very short and fog, for days at a time, delays growth. In addition, the fishing season and the farming season compete and since the former occupation is felt to be the more important, agriculture is neglected. However, there is little doubt that more produce could be

¹ Gordon, H.S., "The Fishing Industry of Prince Edward Island", Department of Fisheries, Ottawa, 1952.

² Refers to Chart 8 in the report cited.

³ Hudson, S.C., and Lewis, J.N., "Land Use and Part-time Farming in Cape Breton Co., Nova Scotia", Department of Agriculture, Ottawa, 1942.

grown for home use to make up the dietary deficiency that is undoubtedly widespread at the present time. Increased farming would necessitate the use of natural fertilizers and humus building products such as sea weed, lobster shells and fish offal, and an increasing enquiry into the types of crops and live stock that could be adapted to the particular environment.

This survey covered 247 rural families in Cape Breton and for analytical purposes they were divided into 5 main groups, including industrial workers, part-time farmers, full-time farmers, fishermen-farmers and dependents. Family earnings (in 1939) were highest in the part-time group (\$1,388) and lowest in the fishermen-farmer group (\$566). At least, in part, this range in family income was due to under-employment in the fishing group. The workers combined third occupations with fishing and farming during the season but, despite this diversification, they were gainfully employed only 104 days of the year, on the average, as compared with 248 days for the industrial group.

In Newfoundland the relationship between the total incomes of fishermen and from sales of farm produce is much the same as in other areas where these two primary occupations are combined. In 1950 a survey of fishermen's earnings was carried out on a sample basis in this province.¹ The report refers to the combination of farming, and other occupations, with fishing in the paragraph quoted below:

Occupations supplementary to fishing include farming, woods work and part-time employment in other industries. In about 70 per cent of the families in our sample, at least one member obtained a cash income from one or other of these sources, but in only 15-20 per cent of the cases did this amount to 25 per cent or more of the total family income. We have obtained details indicating, for example, that about 25 per cent of families obtain income from the sale of garden produce (including wild berries) but, while a few reported sales of several hundred dollars, in most cases the sums were very small. Only eight per cent of families reported an income of \$200 or more from woods work (other than cutting firewood for their own use) and the highest figure in the sample for income from this source was \$600. The woods industry in Newfoundland has acquired a specialized labour force and now relies less than formerly upon seasonal transfers of men from the fisheries. Over half the families obtained income, averaging about \$250 a year, from a variety of other kinds of work: in fish and wood-product plants, boat-building, carpentry, road construction, "coasting", trucking, making handicraft articles and providing rooms or board.

E. Conclusions:

Having regard to the facts available and to observation of the situation in the fisheries of Canada from region to region, it is apparent that the combination of fishing with farming or forestry occupations has not in recent years and is not likely in future to provide a means for establishing a satisfactory livelihood or for appreciably raising income levels. The existence of the appropriate basic conditions conducive to gaining a satisfactory livelihood from combined occupations in the primary industries is decidedly limited. Further, the competition for the management, labor and capital required in the pursuit of more than one principal occupation gives rise to many conflicts. This is especially so as between the fishing, farming, and to a lesser extent, forestry industries. Undoubtedly there are, and will continue to be, instances where a satisfactory combination of these occupations has been realized. There

¹"Report, Newfoundland Fisheries Development Committee", St. John's, 1953.

will be particular situations that will arise in the future; for example, some development now is underway in combining farming and fish pond culture. This combination of enterprises likely will increase in number but measured against the total income produced in commercial fisheries operations it will remain small in proportion.

F. Special Considerations:

The conclusions drawn from this analysis of available information and experience have perhaps their basis in what, for want of a better term, might be described as a "commercial" approach to the fisheries. This approach has been taken in the awareness of a number of other interests and considerations entering into this matter. There is continuing consultation among Federal, provincial and local administrations in regard to social welfare aspects of the availability of alternative occupations. The utilization of certain fish resources is important to Canada's native populations. Among these populations a larger proportion of persons are dependent upon several kinds of activities or occupations for a livelihood. Because of the dependence of these people on fish resources, administrations have tried to avoid, or if this is not possible, at least to mitigate in their programs, any harmful effect upon the livelihood of these people.

As a final observation and in an aphoristic vein perhaps we must refer briefly to the part of raw material resources as forces in generating work and income opportunities in our economy. To this point the data provided and the discussion thereon have been restricted to occupations directly related to exploitation of the basic fishery resources. However, fish being highly perishable is usually processed close to the point of catch. Where fish processing is carried on, (and an ever-increasing proportion of the catch is being processed) additional sources of employment and income are afforded. In most fishing areas there tends to be a chronic surplus of labor consisting mainly of members of the fishermen's families. When those members remaining in the community are able to obtain employment, their income, in whole or in part, for a time at least is a contribution to family income. These income increments are important because they make possible gains in the standard of living for the family unit. Growth in food processing in areas of raw material primary production promotes the development of multisource origins of family incomes. The width of the base for these is governed by the availability and quality of the primary raw material resources.

The CHAIRMAN: Thank you, Mr. Ozere. That is an excellent brief, and it contains much for us to study. Have you any questions, honourable senators?

Senator TAYLOR (*Westmorland*): I would like to refer to the end of your section C, and to your Conclusions where you say: "The existence of the appropriate basic conditions conducive to gaining a satisfactory livelihood from combined occupations in the primary industries is decidedly limited." Prior to that it is said that possibly it is not feasible to combine a farming occupation with a fishing occupation and make a satisfactory livelihood. Is that your opinion, based on experience?

Mr. OZERE: That is taken, generally, from the statistics and the analyses that have been made of them. Perhaps Mr. Rutherford can add a word on that.

Senator STAMBAUGH: It is over Canada as a whole.

Senator TAYLOR (*Westmorland*): I am thinking of the area between Shediac and Shemogue, which I know very well because it is in my home county. The people there farm a little and fish a good deal, and they cut wood from their woodlots. If you follow the road down from Shediac to Shemogue you will see some nice homes. Their income is not too high, of course, but they are making a good living. They start out in the spring with the herring, and then there are the lobsters and the oysters.

I was in the Department of Agriculture for a number of years, and at that time we were trying to make farmers of these people, and found that we could not. They were fundamentally fishermen. In the wintertime they cut wood. I find that over the last few years those people are quite well to do and are obtaining nice incomes.

Over the years I have recommended that our potato industry be removed to the Saint John Valley from the areas down along the coast to get away from all the hand work that is needed. I can recall in my early days as many as 21 ships going out of Shediac to Cuba and other places with cargoes of potatoes. When Cuba ceased to buy our potatoes the potato industry went to the Saint John River area. But, they are still growing potatoes in the same way as they did 50 years ago. They have to pick them by hand because there are so many stones in the ground.

Senator BARBOUR: I do not think what Senator Taylor has said applies to Prince Edward Island at all.

The CHAIRMAN: Can you comment on that, Mr. Rutherford?

Mr. RUTHERFORD: Yes. First of all, I am a little confused, if you will pardon me, Senator. I will say that our conclusions in the brief are general. We are looking at the fisheries of Canada from one side of the country to the other. There are areas where conditions such as you have mentioned have existed for some time, and where relatively satisfactory levels of living are obtained. On the other hand, I think you yourself at one point in your statement did point out the difficulty of trying to make farmers out of fishermen. These people essentially are fishermen, and that is the condition that we have presented in the brief. The areas such as you have mentioned are limited.

In British Columbia there are the specialized fishermen who live largely in urban communities. A high proportion of the fishermen live, in fact, in Vancouver, and they have opportunities of engaging in other primary industry. A few may go logging.

Across the Prairies the fisheries are in the northern parts where agricultural operations are not very widespread. The fishing along the Great Lakes in Ontario is a specialized operation, with large tugboats and crews fishing for a large proportion of the total year. Those boats are busy even in the winter.

The situation along the Gaspé and the north shore is made difficult partly because of soil and partly because of the lack of access to markets for farm products.

The situation in New Brunswick, Nova Scotia and Prince Edward Island is slightly different, I will admit. I think you will find in the brief that an investigating group which looked into the fisheries of Prince Edward Island came to a similar conclusion even before we had this data from the census. Essentially, the people there are dependent upon farming for the most part—I am referring to New Brunswick, Prince Edward Island and Nova Scotia. Of course, the lobster fishing in terms of gross income yielded for the whole of the Atlantic provinces, is almost equivalent to the ground fish—I believe it is about the same as the yield of income from the ground fish which is concentrated in these areas and which is a highly profitable operation for these people.

Senator TAYLOR (*Westmorland*): I do not want to be misunderstood. I do not mean to say that if you have a good agricultural area it should be combined with fishing. I am thinking of these areas where there is good land but not much of it. This is a sort of sandy loam along the shores but does not extend too far back, and we were trying to get them to clear more land and become farmers, but we could not make them, because the land was only suitable for vegetables, and that sort of thing. They then started to concentrate on the poultry and vegetable areas, and these are the best areas we have in

New Brunswick. Tomatoes and strawberries, and similar products, are grown there, and that combined with fisheries is giving those people along there a good living.

The CHAIRMAN: Are you also including Prince Edward Island?

Senator TAYLOR (*Westmorland*): No, not to the same extent. Prince Edward Island has a different soil and has much less wasteland than we have in New Brunswick. Prince Edward Island is differently situated than we are.

Mr. RUTHERFORD: There is a fact that was mentioned, but perhaps was not dealt with sufficiently. The Department of Fisheries development program, which includes assistance to construction and operation of larger vessels, has had quite an impact in that area because of the participation by these larger vessels which has increased, and the decline in the inshore fisheries relatively, so that the inshore fishermen have in some cases been displaced by these large vessels.

Senator TAYLOR (*Westmorland*): Take the northern part of our province, Restigouche and Northumberland counties, the men engaged in lumber devote the summertime to fisheries. There is a combination of income there.

The CHAIRMAN: That is particularly true in Saskatchewan right in the fresh water lake of Last Mountain Lake. Farmers and others supplement their income by fishing in that lake, and some of them do very well.

Dr. PRITCHARD: We are not denying the fact that they supplement their income, but they get a major portion of their income out of one or the other, farming or fishing. If they are fishermen their income is relatively little in relation to these other industries.

Senator TAYLOR (*Westmorland*): It has come to the point that we have stopped trying to make farmers out of these people, and we have organized garden clubs, and tried to get them to keep a cow or two and to plant an acre of garden. We have found that it is a waste of time to try to make farmers out of fishermen.

Mr. RUTHERFORD: In this enumeration that provided material for the analysis, it was found that the supplies they get out of home gardens do contribute to income, and the surprising thing is that the average for the whole of these figures is that nearly half of the fishermen interviewed reported some income in kind, from milking a cow, or from garden produce, potatoes, and so on, but the total contribution of income in real terms converted to dollars was about five per cent.

The CHAIRMAN: Mr. Rutherford, may I ask you a question? To what extent is the pollution of streams or lakes limited to any particular area? Is there any particularly bad area where our streams or lakes are polluted?

Dr. PRITCHARD: At the present moment I would say that I do not think you could single out one really bad area, that is, one area where fish have disappeared. There are areas that we consider to be areas of dangerous pollution. This occurs in the lower Fraser River, from New Westminster to the mouth, where all those secondary industries are dumping and where you have this big problem of sewage disposal from Vancouver and Westminster. We are fortunate that at the moment we have very few cases where there has been an absolute loss of fish. That is the point we are trying to make.

One of the senators asked Mr. Harrison whether anything was being done about this. I agree with Mr. Harrison's statement that there is no official organization that sits down and decides which resource will be developed either to the detriment of one or the other; but certainly in the past ten years, and particularly in the past five, there has been a growing appreciation of these factors, and very seldom now in the fast-developing areas is any industry of any sort developed without consideration of all the others. It is done

informally. The senior men in the area get together. In our industry, that of the fisheries, the Government departments, both provincial and federal, are trying to work out a compromise which will save the fisheries and allow the industries to develop. I think this is what has to be worked out. Our act, of course, is pretty strong, in that the Minister of Fisheries could if he wanted stop an industry developing; but it seems to me that it is a little too much to ask the Government to do that without considering the general economy; and when you know, as has been said here, that there are methods of working this out, then the only thing to do is to get together. This is what is happening, for instance, in the lower Fraser River. The provincial government has a pollution board. All water applications for the use of water and discharge are referred to this pollution board. This board undertakes to advise every department and industry that is interested so that the fisheries can say what they want done. The result is that more industries are developing. But we do not like the pollution level even as high as it is. However, industry has been putting purification on its effluent. I might say that it can be done. We had similar problems in eastern Canada with the development of the big oil refineries, where at the outset there was no intention of purification of the plant, and the amount of effluent that would have been discharged would have polluted one of the biggest harbours, and you would have smelt phenol on every fish in the country. After about half a dozen discussions the industry came up with a treatment method, and now their phenols are far below what they thought, and the discharge is going, at our request, to a deep water area in which it will dissipate. This is the sort of thing you can do. I just wanted to say that even though there is no official, overall big authority that tells us what to do, nobody now in modern industry ever moves without consulting them.

The CHAIRMAN: There is no official co-ordinating body at all?

Dr. PRITCHARD: No, there is not, and this may be the result of a variation in jurisdiction.

The fisheries industry is peculiar and, perhaps, favoured in that complete legislative jurisdiction is federal, and it is the only industry treated that way. Public health, of course, is provincial. We do not have that trouble because the legislative jurisdiction is here, and we can step into difficulties where it might not be possible in other fields.

Senator STAMBAUGH: Is that true in the case of the inland lakes in the Prairies?

Dr. PRITCHARD: Yes. I think I should explain this. Under the B.N.A. Act all legislation is federal. Let us take the province of Saskatchewan. If they want to change a regulation for their fishery it must be done federally. The act under which they operate is federal. That is what the B.N.A. Act said when it came into effect. Since that time there have been agreements made between certain provinces and the federal Government, and the provinces have to be able to manage their own fisheries. That agreement says that you can manage your own fisheries, but the legislation is still federal. For instance, in the province of Ontario, the province of Quebec and the Prairie provinces it might surprise you to know that they are working under regulations made under the Fisheries Act. The regulations are made here by Order in Council, and they must be changed here.

Senator STAMBAUGH: They are generally administered by the provinces?

Dr. PRITCHARD: Yes, in Ontario, Quebec and the Prairie provinces. In the province of British Columbia we administer the marine and anadromous. That is a big word, but it refers to things like the salmon that spawn in fresh water and live in the sea. This may surprise you, that in New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland the federal Government has

both the legal and management responsibilities. These governments may have their fisheries acts, but they do not, of course, supersede or over-ride the federal act.

Senator STAMBAUGH: With regard to water pollution, I was just going to mention the Canadian chemical plant which started at Edmonton. If something had not been done very quickly there would have been a complete destruction of the fish.

Dr. PRITCHARD: The unfortunate part of that—and I should explain it—is that it happened at a time of the year when it was impossible for us to tell whether the kill of fish downstream, say at The Battlefords, was as a result of winter kill or as a result of chemical action.

Senator STAMBAUGH: That is right; I remember that.

Dr. PRITCHARD: However, we did get right after it, and there is no doubt that if they had not cleared it up the North Saskatchewan would have been in a bad way. Perhaps you do not know this, but it was rather fortunate the discovery was made by a man from our federal department of National Health and Welfare, who went out there to look the situation over. He went into the area and detected the smell. He said, "Gosh, that smells familiar". It suddenly hit him that phenols were coming from somewhere.

Senator STAMBAUGH: It was generally figured it was the winter kill to start with, but it was not a winter which was bad enough to cause that amount of damage.

Dr. PRITCHARD: Yes, but when it started to gum up the treatment plant at The Battlefords it was obvious it was not winter kill.

The CHAIRMAN: Thank you very much, gentlemen. I think this is a very good brief, and we have learned a lot about the fisheries aspect of this matter and the co-operation of the fisheries department with the Department of Agriculture.

Senator STAMBAUGH: Mr. Chairman, I move a vote of thanks to these gentlemen for their excellent presentations.

Senator TAYLOR (*Westmorland*): I second it.

The committee adjourned.

MAN 2 . 1965



Fourth Session—Twenty-fourth Parliament
1960-61

THE SENATE OF CANADA

PROCEEDINGS OF

THE SPECIAL COMMITTEE OF THE SENATE

ON

LAND USE IN CANADA

No. 4

THURSDAY, MARCH 2, 1961

The Honourable Arthur M. Pearson, Chairman
The Honourable Henri C. Bois, Deputy Chairman

WITNESSES:

Messrs. Eric Thrift, General Manager, National Capital Commission;
and Douglas McDonald, Director of Planning and Property, National
Capital Commission.

APPENDICES

Exhibit "A":—Housing and Its Environment.

Exhibit "B":—Analyses of Postwar Residential Subdivisions. Metro-
politan Area. National Capital Region.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Golding	Molson
Basha	Higgins	Pearson
Bois	Horner	Power
Boucher	Inman	Smith (<i>Kamloops</i>)
Bradette	Leger	Stambaugh
Buchanan	Leonard	Taylor (<i>Norfolk</i>)
Cameron	MacDonald	Taylor (<i>Westmorland</i>)
Crerar	McDonald	Turgeon
Emerson	McGrand	Vaillancourt
Gladstone	Méthot	Wall
		White—31.

(Quorum 5)

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

'The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Blois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—

Resolved in the affirmative."

J. F. MacNeill,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

THURSDAY, March 2, 1961.

Pursuant to adjournment and notice the Special Committee of the Senate on Land Use in Canada met this day at 11:00 a.m.

Present: The Honourable Senators: Pearson, *Chairman*; Barbour, Basha, Golding, Higgins, Inman, MacDonald, McGrand, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*) and Turgeon.

In attendance: Mr. Ralph A. Stutt, Special Consultant to the Committee, and Mr. Alan Tate, Chief Planner, National Capital Commission.

Messrs. Eric Thrift, General Manager, National Capital Commission, and Douglas L. McDonald, Director of Planning and Property, National Capital Commission, presented a brief, were heard and questioned.

The following Exhibits were filed and Ordered to be printed as an Appendices to today's proceedings:—

Exhibit "A"

Housing and Its Environment.

Exhibit "B"

Analyses of Postwar Residential Subdivisions. Metropolitan Area. National Capital Region.

At 12:15 p.m. the Committee adjourned to the call of the Chairman, tentatively set for Thursday, March 9, 1961, at 11:00 a.m.

Attest.

James D. MacDonald,
Clerk of the Committee.

THE SENATE
SPECIAL COMMITTEE ON LAND USE IN CANADA
EVIDENCE

OTTAWA, Thursday, March 2, 1961.

The Special Committee on Land Use in Canada met this day at 11 a.m.

Senator ARTHUR M. PEARSON in the Chair.

The CHAIRMAN: It is now 11 o'clock, honourable senators, and we have a quorum. Mr. McDonald, the Director of Planning of the National Capital Commission is present and he is willing to commence the presentation, but Mr. Thrift, the General Manager of the National Capital Commission has not yet arrived. Shall we commence now, or shall we wait for Mr. Thrift?

Senator HIGGINS: I think we should commence.

Senator SMITH (*Kamloops*): Yes, because this looks as if it will be a lengthy program.

The CHAIRMAN: Mr. McDonald, would you give us a resume of your background and your duties with National Capital Commission, and also your qualifications?

Mr. D. L. McDonald, Director of Planning and Property, National Capital Commission: Mr. Chairman and honourable senators, my name is Douglas McDonald, and I am Director of Planning and Property for the National Capital Commission. I am a graduate landscape architect who, right after the war, went with Mr. Greber on the Nation Capital Planning Commission until 1949. At that time I switched to what was then the Federal District Commission in an administrative capacity and worked on the development of land for the Federal District Commission development at that time and then swung over to the planning end of things in 1955.

Mr. Thrift has now arrived, and I am very happy to give up my place to him.

The CHAIRMAN: Then, Mr. Thrift, would you give us the background of your accomplishments, et cetera, with the National Capital Commission?

Mr. Eric Thrift, General Manager, National Capital Commission: Perhaps I have not much to say as to background and accomplishments in this particular office because, as some of you may know, I came to Ottawa in October, 1960, after having been Director of Planning for the metropolitan area of Greater Winnipeg for some 15 or 16 years. Much of what you find in here is the result of work done and ideas developed in the office of the National Capital Commission by its staff. However, I have been over all of this. I have had my finger in the pie, as it were, in the preparation of this, and I subscribe to what is found here. I am, in effect, part of the staff that has created this document.

Perhaps, for a moment or two, I might outline the substance of the submission. There is a brief introduction which, as you will see, deals with the general reasons for the development of any community. Then we go into the

different land uses in an urban area, classifying them into five general categories of industrial, residential, commercial, institutional and open space, which are all dealt with separately although you will see a common relationship throughout.

Senator STAMBAUGH: I did not understand just what you were doing in Winnipeg.

Mr. THRIFT: I was Director of the Metropolitan Planning Commission for Greater Winnipeg. If there are any other details required I would be pleased to supply them. The study of metropolitan planning has been my background for a long time, although I was originally trained in architecture.

The last sections of the submission deal with the centres of community development. This has to do with facilities such as schools, churches and recreational facilities, and so on, and with redevelopment, and then we deal with what we have called the study region which is, in effect, the whole area which encompasses a city or an urban centre, whether it be one or several municipalities. We deal with the single urban conglomeration which we find in so many places and which may in part be made up of several municipal jurisdictions. Here we deal with this city and its surrounding area as a unit.

Senator STAMBAUGH: Winnipeg has not been a metropolitan area for very long, has it?

Mr. THRIFT: There is a metropolitan corporation now which was established by statute about a year ago. The council was elected last October, and it came into office immediately and started to assume its responsibilities on January 1 of this year. The Metropolitan Planning Commission as such, which was organized, established, financed and operated by the city and municipality of Greater Winnipeg generally under a provincial statute, has existed for some 15 or 16 years. Its responsibilities were assumed by the new metropolitan corporation. The Metropolitan Planning Commission as such does not any longer exist. Its responsibilities are part of the responsibilities of the new metropolitan corporation.

Senator STAMBAUGH: Thank you.

Mr. THRIFT: I would like your direction, Mr. Chairman. Would you like me to read this?

The CHAIRMAN: Yes, we would prefer to read this to the committee, and then later questions will be asked. There may be one or two questions asked as you are going through it.

Mr. THRIFT: Yes.

PRINCIPLES OF LAND USE IN ORDERLY URBAN DEVELOPMENT

A. Introduction—Reasons for Development:

The growth of urban centres is due to natural increase of population and immigration. Natural increase is a function of birth and death rates. Immigration results from job opportunities created by the expansion of economic activity in the community.

The size of cities or more properly, urban centres, will continue to increase. The Royal Commission on Canada's Economic Prospects has indicated in this regard that "By 1980, Canadians living in cities, towns and villages of 1,000 population or more, and in other settlements forming part of large urban areas, will account for almost 80 per cent of the total population compared with just over 60 per cent in 1951. Close to 50 per cent will be living in enlarged versions of the present 15 Census Metropolitan Areas and more than half the population will be living in Metropolitan and Urban Areas of over 100,000 population".

B. Basic Factors Shaping City Growth:

Two principle sets of factors determine the shape of an urban area. These are: (a) physical, and (b) man-made.

Physical factors are usually, but not always, of course, unchangeable. They include steep slopes, water areas, earth and rock formations, swamps and forests. Some of these physical features inhibit development but are not necessarily disadvantageous. Steep slopes and areas of water serve important recreational and sometimes industrial purposes. Swamps may form important conservation areas or with suitable treatment, valuable truck farming districts serving urban areas with vegetables.

The pattern of municipal servicing is determined in large measure by the topography and physical characteristics of an area. Modern cities must have adequate servicing by water and sewers and the servicing pattern molds the form of the city. There are many areas relatively close to expanding metropolitan centers which would be valuable building land but for the fact that they cannot be serviced economically; conversely, the possibility of economic servicing will raise in spectacular fashion, the land values of any area within commuting distance of centers of employment.

Of the man-made factors the most important are political organization and modes of transportation. Political organization is constantly changing though not necessarily in accordance with any logical or discernible pattern. Modes of transportation, by contrast, are directly related to advances in technology: developments in the immediate future can be foreseen and planned for.

Political boundaries in Canada were generally laid out when the maximum speed of travel was about 12 miles per hour and the daily limit of interest of most urban dwellers was limited to reasonable walking distances. In the National Capital, as in other urban centers, this basic political framework has been modified by annexations but these revisions have lagged far behind the spectacular development of methods of transportation, the technical requirements of servicing the explosive growth of recent years, and the enormous increase in personal incomes.

The political organization with which we are now seeking to control, direct, and provide for the growth of this and other cities must, we suggest, be modified if we are to secure the maximum benefit of planning and engineering techniques and avoid wasteful and unsightly urban development. The sphere of influence of an urban area as defined by its marketing area, by the pattern of commuters' travel, or by other recognized criteria, should also be the planning area. Only in this way, is it possible to deal comprehensively with urban areas which are, in every real sense, homogeneous.

C. Types of Land Use:

There are five basic types of land use with which we are concerned in urban development. The following outlines some of the fundamental characteristics of each.

We say some because, as you will appreciate, going into detail of all characteristics of these various land uses in the city is extremely complicated. We have tried to outline the basic frame so that we would not get into writing a book.

1. *Industry:* Work of some kind is necessary for the establishment of any city. There are of course, dormitory communities but these are in a sense parasitic as they can only exist as part of a larger economic urban area. Work is the *raison d'être* of any community and the fact that the centers of employment may lie on one side of a political boundary and homes on another, in no way invalidates the principle that industry of some kind is a necessary part of any balanced community.

The three main types of industry are basic extractive industries, industries concerned with conversion of materials to goods, and service industries.

An urban area which depends upon one or a very small number of basic industries has special problems. e.g. insecurity, if the basic industry should fail, lack of employment opportunity (perhaps, for example, for the female fraction of the population), and a narrowing of outlook and opportunity for the community generally. This, however, is not the common case. Most urban areas exhibit many functions and have diverse employment opportunities. The location of these within the framework of the city is the usual problem.

In the National Capital, the Commission believes that generally speaking, heavy industry which may be noxious or offensive has no place in the center of the built-up areas but should be located on the periphery related to railway, road, or water transportation. Provision has been made for a heavy industrial zone in such a situation in the National Capital Plan.

Light industry, however, constitutes an entirely different problem. Rail service is not nearly so important now as it was and it has been our experience in the development of so called light industrial areas that proximity to excellent road transportation is much more fundamental. We have, however, been impressed by the growing value of the railway's piggy-back rail service for such light and medium industrial uses, since it appears to combine major advantages of truck and rail facilities.

The fact that light industries are seldom noxious or offensive and may quite properly be sited in areas which are surrounded by residential development makes the problem of planning control of first importance. The R. L. Crain printing establishment in Ottawa, for instance, represents a type of industry which is perfectly acceptable in or beside residential areas and an architectural form which is as pleasing as that of many public buildings. This can be done and is being done in many places.

The Commission has been concerned with the development of its own industrial areas and has investigated various methods of securing adequate control. Officials of the Commission were most impressed by the use of Deed Restrictions to control development at Don Mills, Ontario. This procedure can be made more comprehensive than zoning as aesthetic and other matters not normally included in zoning bylaws can be covered. As well, deed restrictions are more permanent than zoning which may be subject to change. Accordingly, Commission land which is being sold for industrial purposes is now subject to deed restriction controlling use of land, car parking, height and bulk of buildings, aesthetics, use of signs, and landscaping. It may be noted that this form of control has also been used by some municipalities but only, of course, in cases where they own the land.

It is the owner who can establish deed restrictions, and the municipality can do this if it owns the land.

The Commission has found that for its industrial areas, as at Don Mills, there has been no real difficulty in finding industrialists who are willing to accept the limitations imposed on their own activities in return for protection against possible adverse effects on their operations and on the value of their property by the activities of their neighbours. They are also attracted by the efficiency of these well-designed industrial areas which are located in accordance with the National Capital plan, adjacent to one of the major road intersections in the region, and close to the new freight and piggy-back facilities of both railways.

2. *Residential:* Residential development constitutes the dominant land use in our urban areas. It requires good exposure and drainage, gently sloping terrain, good communications (especially to places of work and shopping), and preferably some woodland. Generally, there is a conflict between the needs of

agriculture and housing on the periphery of cities. While housing is often the more profitable use of the land, the Commission is of the opinion that there are lands which might be declared special areas of conservation to protect such lands for all time against residential development. This conservation method may be necessary to protect an area of special beauty, or of irreplaceable farmland. Additionally, it is important to conserve certain swamps and other areas, the drainage of which would jeopardize the preservation of the water table. Lastly, conservation may be necessary to ensure access to natural resources such as mines, quarries, forests, etc., the development or extraction of which is necessary in the public interest. Moreover, conservation measures are essential for adequate preservation of our water resources and in many cases our soil resources. Effective water control and conservation generally prevents serious soil erosion and destruction.

The most difficult and persistent problem in residential development arises in our opinion, from the lack of overall programming of housing construction and the consequent urban sprawl. In this connection, the Royal Commission on Canada's Economic Prospects—Housing and Social Capital, by Yves Dubé, J. E. Howes, and E. L. McQueen reported "If . . . future peripheral growth is heavily characterized by chaotic sprawl and leapfrogging, there is no telling what the social capital cost is likely to be. But it will certainly be high."

This has been done many times in many ways and in many places. It is terribly expensive and we all pay the price.

Residential sprawl has been described as making five acres do badly what one acre might do well. It creates short-term and long-term difficulties. In the short-term it creates waste areas and partially developed suburbs which are unsightly and sometimes create nuisances. Life in the partially developed suburb is, of course, inconvenient and there is considerable difficulty and expense in servicing such areas by public transport, mail and other deliveries. Road maintenance costs per foot and frontage are also disproportionately high.

In the long-term the premature development of land leads to the development of a road and lot pattern designed for individual septic tanks and wells. Fifteen thousand square foot lots are the minimum size permitted for development in Ontario under the Ontario Statutes. Such lots do not fit well into an efficient urban pattern based on the provision of full municipal services.

Studies by the Commission in March 1958, in the Ontario section of the Ottawa-Hull Metropolitan area show that subdivisions registered between 1950 and 1958 in the City of Ottawa, contained 2,798 vacant lots. Additionally, in the Townships of Nepean and Gloucester there were 1,543 vacant lots. A further survey two years later in 1960, showed that the same registered plans in Ottawa had been substantially developed with only 87 vacant lots remaining. In the townships, however, the vast majority (972 lots) were still undeveloped. Additionally, 19 new subdivisions had been registered in the townships in the two-year period, containing 2,407 lots. This raised to 3,379 the vacant registered lots in Nepean and Gloucester.

In February 1960, the Commission prepared an exhibit and presented a brief to the Committee on the Quality of the Residential Environment sponsored by the Royal Architectural Institute of Canada. The exhibit and brief included an analysis in detail of 24 residential subdivisions in the Ottawa-Hull Metropolitan area and listed the deficiencies of these subdivisions which arose because of poor programming of construction.

As a matter of fact, Mr. Chairman, a copy of our short statement entitled "Housing and its Environment," which we submitted to C.H.M.C., will be found at the back of this submission. We have also included a summary of the Analysis of Post-War Residential Subdivisions, dated June 1, 1960. I would request that these documents be made appendices to our submission.

(See Appendixes "A" and "B".)

Obviously, precommitment of land leads to waste of land. Additionally, such development leads to a considerable disorganization of municipal services and public transportation. Lastly, it produces impossible problems for building committees for churches, and other organizations concerned with the provision of those community facilities which are an essential part of an adequate urban life.

As a result of sporadic and premature development, many Canadian children grow up in housing areas which lack basic services, roads, social facilities, parks, or even schools. There are many such areas in the National Capital Region. We believe that there should be a correlation between the demands for housing units and the registration of plans of subdivision. The demand for such units does not only fluctuate because of population growth but is also influenced by:

- (a) The aging population;
- (b) Fluctuations in family size by age groups; and this rises and falls;
- (c) Changing living standards (economic and technological).

These factors influence the number of persons per housing unit and hence, housing demands. It is possible that in a buoyant economy there might be a demand for new housing units with a static or even a declining population.

Now, as people's incomes increase, although there may not be more people, this increases the demand for more housing accommodation, because such people have more means. If I have money in my pocket I can buy a new house. On the other hand, it might go the other way with a decreased population.

We consider that many of the problems of our burgeoning residential areas could be resolved or alleviated by a program of development based on a realistic assessment of future demand for housing units in each urban area. The program would have to take account of projected increases in population, family size, incomes and trends in housing, including the proportion of the housing market likely to be met by apartments and other intensive forms of development in the future.

The implementation of the program would require the rigorous and imaginative application of the prematurity provisions of the Ontario Planning Act or similar legislation in other provinces.

3. *Commercial*: In the allocation of land for commercial purposes and the formulation of bylaws or other measures governing its development there are two principal areas of concern. These are:

- (a) Suburban shopping centers
- (b) Downtown shopping and the central business district

Measures for the control of "Cross-road development" appear to be inadequate in the Ottawa area. Invariably they are unsightly and, by reason of their poor layout, inefficient; and this happens in many areas all over the continent. In many new residential developments, there is a small group of stores, at least one service station, a school, and one or two churches. The school may, of course, be treated as a special problem, but the other buildings must be related if a recognizable nucleus for the development is to be formed. Rigorous exclusion of commercial uses from the residential parts of the neighbourhood is necessary but in addition, positive action is needed to create well-designed centers, a matter dealt with more fully in a later section of this Brief.

Downtown contains, beside the principal commercial areas of the city, much of its entertainment life, many restaurants, offices and businesses. Symbolically, too, it is the city. However, insofar as the problems which beset many North American downtown sections are commercial problems, the Central Business District might be conveniently dealt with under the general heading of commercial land use.

Lack of parking is frequently given as the reason for retarding commercial development or even decay downtown, but this, in the Commission's opinion, is by no means the only, or even the most important reason. Downtown is often in decay largely because it is inefficient and unattractive. It is inefficient because it was built for a time when requirements were quite different from those of the mid-twentieth century.

Realizing this, many retailers have improved their stores by the addition of air-conditioning, new fronts, decor, reorganized interiors, and in some cases, provided their own parking facilities. They are powerless, however, in general to improve the general environment of downtown. This can only be accomplished within the framework of a plan implemented with the co-operation of the majority of the merchants and businessmen and with the backing of an enlightened municipal government.

Parking is important, of course, but the Commission was interested to observe during the Sparks Street Experiment last year the very large increase in bus travel to the area at off-peak periods. The Ottawa Transportation Commission estimated that there was a 38 per cent increase in the number of people travelling to Sparks Street during the period ten a.m. to four p.m., and attributed this rise in passengers carried, directly to the mall. The mall also, of course, led to a substantial increase in business for many classes of merchants on the street during the entire period of the experiment. Rather than getting extra parking during this time, there was in fact, less parking than in the period preceding the mall (due to the removal of parking meters from Sparks Street itself and from Wellington Street, where parking could not be permitted owing to the greater number of vehicles carried).

The Commission believes that downtown must be treated comprehensively. Means of access to it by public transit and by private automobile must be improved and parking areas on the periphery of the central business district must be developed. These may be connected directly to the shopping areas by covered ways, pedestrian promenades, or heated arcades. The pedestrian mall idea is attractive in some situations but is not applicable to all. Advantage must be taken of any assets that exist in downtown and if there is some key area close to the commercial heart which can be made available for redevelopment this should be made a starting point for revitalizing of the area.

The ribbon development of commercial uses along principal traffic arteries is unsightly, wasteful, and dangerous. It introduces disruptive elements into the traffic flow, and renders traffic signals illegible, especially at night when red neon is much in evidence. It does not permit a reasonable arrangement of parking and pedestrian circulation in the commercial areas themselves.

In general, therefore, we believe that there should be rigorous control of strip commercial development, a positive program of the development of suburban sub-centers, and a vigorous program to restore and enhance the valuable assessment and rich variety of activities which is represented by downtown.

4. *Institutional*: The cultural and spiritual life of the community is in large part contained in its institutional buildings. They also fulfill an important symbolic function. In the development of institutional land use there are two main problems.

- (a) Institutions are frequently limited financially, and cannot compete with well endowed private enterprises such as oil companies whose service stations frequently occupy sites which in the community interest, might well be occupied by community buildings.
- (b) Many major institutions, such as hospitals, schools, particularly secondary and technical, public research facilities, require very large tracts of land but their needs are not completely known when suburban areas are developed. Alternately, a need may be foreseen but the money cannot be made available at the time of development to secure the sites.

The reservation of land for institutional purposes, both public and private, is necessary if institutions are to become part of the fabric of the community. The reservation of such lands is so important that it may have to be undertaken by a senior level of government. Rapidly expanding rural townships—the urban areas of the 1970's—are typically the areas where reservation of land to institutional purposes is most important but where financial resources are least adequate for the task.

It seems a proper function of the planning authority to assure the reservation of land in strategic locations for uses which cannot at the time of development, be foreseen. In a rapidly expanding country such as Canada, the reservation of such areas as well as being good business, provides an important heritage for future generations.

5. *Open space:* Open space is need for: a) local use, and b) general metropolitan use.

With regard to local open space, the present provisions of the Ontario Planning Act state that the Minister may determine that "an amount not exceeding 5 per cent of the land included in the plan shall be dedicated for open space (subject to the provision that in some cases municipalities accept cash in lieu) but the provision of open space should more properly be related to the number of people in any particular area. The present system means that in areas of single family homes on spacious lots a maximum of open space per head of population exists. In high-rise or apartment areas there is frequently a drastic shortage especially as a very great deal of the open ground area around the buildings is used for parking. In other words the areas which need open space the least are most generously provided with such space.

The changing needs of our expanding cities will lead to the redevelopment of many single family home areas by dense development in about twenty or thirty years. In our opinion, all present open space in these areas must be preserved to integrate with such redevelopment.

The major open space requirements of a metropolis are very much more extensive than simply the provision of space for recreation. It should limit and define the urban area, provide areas for conservation or essential agriculture, provide a reservoir of land for possible future institutions, avenues for jet flight paths or ring roads. It should also provide a broad sweep of agricultural and woodland contiguous with the city.

It has been the experience of the Commission that the only effective method of securing adequate amounts of open space or land for public use has been outright purchase. The Commission has attempted to secure the Greenbelt by means of zoning and also by the implementation of the prematurity provisions of the Ontario Planning Act. The acquisition of development rights was also exhaustively investigated on behalf of the Commission, by the Department of Justice, but was not found satisfactory. So far as is known to the Commission, the National Capital Greenbelt constitutes the only attempt in North America to limit and define the metropolitan area, to curb urban sprawl, and to stimulate intensive development within the city itself through the outright purchase of open land.

The effects of the Greenbelt are becoming evident. It has attracted the research and development headquarters of an important Canadian manufacturer of electrical equipment and is providing sites for important government activities such as Defence Research Board, Mines Branch, and Animal Research Institute. All industry, institutions, and other uses in the Greenbelt will be designed and laid out in a manner which is compatible with the essentially open space character of the area.

The greatest single criticism of open space areas as they are defined in most of the plans to which our attention has been drawn, is that they are not comprehensive enough. Frequently, 5 per cent lands are scattered over an area securing no one natural feature for the future. Clearly, if only a limited amount of open space can be preserved, advantage should be taken of the topography to secure waterfronts, natural wood lots, or high ground. The lack of official plans, area plans, or even a consistent policy on the part of the municipalities in this matter all contribute to the problem.

D. Centers of Community Development:

Zoning does not in itself constitute positive action as it changes nothing unless the land owner actually wishes to build. The point we wish to make is that zoning does not create anything; it merely guides those who want to create. Moreover, it exercises negative control in the sense that it cannot produce good civic design or even efficient layout, but only prevent undesirable uses and ensure safe and sanitary standards of layout.

This is not in the nature of a criticism of zoning, but merely an attempt to understand clearly its limitations. It is a very useful instrument, but only in so far as it can go.

The limitations of zoning as a tool in the building of our cities are especially apparent in the centers of new urban areas. Typically, such centers grow around a convenient location (usually a cross-roads or along a highway) where there is no zoning or alternatively, where commercial zoning prevails. They are likely to develop in a haphazard fashion which is invariably unsightly and often inefficient. This inefficiency is sometimes due to the duplication of parking facilities and ill-planned access points from these facilities to abutting roads, but may also be due to poor orientation of the buildings, bad pedestrian circulation, or lack of proper loading facilities—any one of many things, or a combination of them.

The Commission has noted the fact that these centers typically lack the cohesion, efficiency, and civic dignity which comprehensive planning could give at no extra cost. It is our opinion that this problem is one of great importance and its solution depends on the preparation of outline plans for urban centers, the assembly of necessary land and the application of planning controls to ensure development in accordance with the plan. We consider that the possibility of the assembly of land for urban centers by municipalities and the development of the land by private enterprise under lease-hold or deed restriction arrangements should be explored. This would be another application of the powers now provided for urban renewal, road rights-of-way, and other projects necessary in the community interest and would make possible the creation of centers which would give a practical and symbolic focus to the newly developing parts of Canadian cities.

E. Redevelopment:

The inefficiency and outmoded street systems typical of downtown in North America, the high land values there, and the increasing proportion of decrepit buildings, all point to a need for substantial redevelopment in the next decade. Additionally, many areas developed with single family homes even in the post-war period have experienced changes due to the development of new highways and other reasons. In many cases the value of the land is rising fast, whilst the value of homes is declining or rising much less quickly than that of the land itself. Again, redevelopment becomes a possibility in the relatively near future.

Redevelopment is one of the most complex aspects of city building and we believe that the crux of any successful scheme is the assembly of all the land in the designated area so that it may be developed under a comprehensive scheme.

The National Housing Act states "in order to assist in the clearance, replanning, rehabilitation and modernization of blighted or substandard areas in any municipality, the Minister, with the approval of the Governor in Council, may enter into an agreement with the municipality providing for the payment to the municipality of contributions in respect of the cost to the municipality of acquiring and clearing, whether by condemnation proceedings or otherwise, an area of land in the municipality. A substantial part of the area at the time of acquisition was, or after redevelopment will be, used for residential purposes." Here we underline this condition of residential use either before or after.

The emphasis of this Act is, however, on housing. Therefore, commercial or industrial properties may only be redeveloped if ancillary to the housing. Many of the properties which require redevelopment are commercial or industrial and the best use of the land after redevelopment may be commercial, industrial, or possibly entertainment or civic buildings. The Act makes no provision for assistance in such cases. To properly redevelop the downtown areas of our cities it will be necessary to take land forcibly from certain commercial and industrial enterprises and make it available to other similar enterprises. Unless this procedure is adopted successful redevelopment and renewal of our downtowns have little hope of success. We believe that American practice has something to teach us in this regard as have the procedures now followed by the London County Council in England. In both countries land is assembled by a governmental body and developers are invited to present schemes for its development within the framework laid down in advance. The developer presenting the best scheme is given the land by lease or by deed. He gets it after he has made his case and convinces them he is the best man to do it.

F. The Emergent City/Region:

In the notes above, reference has been made to the major types of land use. The problem is not one, however, which can be viewed in any compartmentalized way. Typically, the twentieth century city transcends political and administrative boundaries because of: (a) its sheer size, and (b) the interdependence of its various parts.

The interdependence of the parts of the urban region is likely to increase as the size does, because given a suitable method of transportation, public or private, it is quite feasible for residents to work many miles from their homes and travel for such occasions as brief family gatherings hundreds of miles.

Additionally, drainage areas must conform to the topography and land forms. Hence they frequently cross political boundaries. The servicing of large agglomerations of population must be in accordance with what is technically feasible, rather than what is politically desirable. Hence, regardless of religious or ethnic preferences, political or legal intervention, the logical, natural, and almost inevitable growth of the city is often determined by physical and economic factors.

This does not mean that it is impossible to organize and order the growth of the community or even a conurbation. The principles noted above may be applied by a central planning agency to so order the growth of a metropolis that full economic development is permitted and the enjoyment of civic liberties assured within the framework of an acceptable plan. The essential point is that the unit of planning and decision making must be one which has some logical basis in the geographic, demographic, or physical facts of the region.

G. Application to the National Capital Region:

This statement on the principles of land use omits a great deal of detail on the work the Commission is actually doing in the National Capital Region. It may be appropriate, however, to list nine principles to which the Commission has adhered over the years both in its own work and in the advice which it has been asked to give to municipalities. These are as follows:

1. To define the city and region so that growth may be accommodated without producing an amorphous and congested mass of inefficient building. This is being achieved by the provision of parks and parkways and by the provision of the Greenbelt.
2. To designate areas of fairly close-knit and integrated residential development, each served by suitable community and social facilities, and commercial areas.
3. To preserve the vigour, diversity and interest of downtown, and to do whatever can be done to increase the interest of this area, and its prosperity to go with it.
4. To clarify and improve the communications system throughout the region, and specifically to remove from central areas, railways and their ancillary industries, to ensure improved circulation and more effective land use development.
5. To provide for adequate commercial and industrial development thereby improving the tax base for the component municipalities and generally jobs for its citizens of the future.
6. To create a number of areas which provide for the various government departments to be located there, a suitable milieu for efficient and creative work.
7. To raise the standard of civic design everywhere, but especially in the downtown area. The crux of this work will be the proper development of the Union Station site and related works necessary for the revitalization of the city center.
8. To provide parks and recreational facilities on a scale and of a kind appropriate to the city it is designed to serve.
9. To provide for future growth of activities the nature of which may not yet be contemplated, by the reservation of suitable land. One of the functions of the Greenbelt, of course, is to contribute to this reservation for the future.

The CHAIRMAN: Thank you, Mr. Thrift. You have presented a most comprehensive brief. Honourable senators, have you any questions to ask. I am sure Mr. Thrift will be pleased to answer them.

Senator SMITH (*Kamloops*): I may have missed this in the context while going through it quickly, but I am wondering to what extent if any the National Capital Commission is subject to the Ontario Planning Act? Under that act can the authorities impose the same regulations as they would in connection with any urban area in the province?

Mr. THRIFT: Yes.

Senator SMITH (*Kamloops*): So that the development and planning is subject to everything contained in the Ontario Planning Act?

Mr. THRIFT: Yes. The capital area on the Ontario side, under the Ontario Planning Act, is the same as any other urban area in Ontario.

Senator BARBOUR: The National Capital Commission does not override other authorities?

Mr. THRIFT: No.

The CHAIRMAN: Is it the opinion of the Commission that the green belt is the solution to the urban sprawl of a city?

Mr. THRIFT: It is one effective device and, we think, a most effective device in cutting off a great deal of the sprawl, and it looks now as though it is helping to concentrate a good deal more attention in the city itself and in the built-up areas and those immediately adjacent to it, so that we are getting a more businesslike and efficient concentration of urban development. Without it you could find little bits and pieces popping up all over the area. This device will help to prevent that, and it is happening in cities all over the continent.

The CHAIRMAN: Does the green belt force any redevelopment in the centre of the city?

Mr. THRIFT: We think it will have an important influence. It was not designed to do this but it will have an influence in this direction. It increases the interest in the central area because this is where, as we know, business will be concentrated.

The CHAIRMAN: What will happen if you find yourself shut in by the green belt if there is an explosion of population in the area of the city of Ottawa?

Mr. THRIFT: A proposal included in the National Capital Plan was that what are called satellite communities would then be established outside the green belt within commuting distance of the main urban centre. They might develop their own businesses and industries and a life of their own but they would be part of the capital region although established as separate units. These smaller centres would establish their own churches, school facilities and businesses and have an integrated community of their own.

Senator STAMBAUGH: Is there not something like that now at Bell's Corners?

Mr. THRIFT: Bell's Corners is really within the green belt but it has existed for so long that obviously it was foolish for anybody to suggest this would not continue. It is surrounded by the green belt. It is contemplated that other communities of a similar nature might develop beyond the green belt.

Senator TAYLOR (*Westmorland*): Half way down in the second paragraph on page 9 of your brief you say:

"To properly redevelop the downtown areas of our cities it will be necessary to take land forcibly from certain commercial and industrial enterprises and make it available to other similar enterprises."

It seems to me that there should be a qualification there. You would not suggest that if an industrial enterprise is using and can use every foot of land it has, you are going to take part of it or all of it away and give it to somebody else?

Mr. THRIFT: We put that in pretty plain language because we did not want anybody to miss the point. What it means is that you may find, for example, an area of three or four blocks that is pretty badly deteriorated and needs redevelopment. It is presently occupied by industries and businesses which are getting by in old buildings but in the interests of the city the area should be cleared out and redeveloped. Then you face the problem of negotiating the purchase of these properties or expropriating them.

It does raise a serious question of moving a business out of its present premises in order to clear out and redevelop an area, but it may be that new owners who have come forward with a more practical or comprehensive proposal for redevelopment will take over. This is a question we have to face up to. It is a difficult problem but we have to meet it.

The CHAIRMAN: Is it possible to negotiate with certain industries in an attempt to have them move outside into the outer periphery?

Mr. THRIFT: As a matter of fact, in many cases we are doing that now. In the case of the Queensway development there are industries there whose property is being purchased and who are buying or exchanging property, acquiring property further out on which they can re-establish with perhaps better results than they have had in the more central area.

Senator TAYLOR (*Westmorland*): There is a good chance for improvement on the edge of Eastview. I lived there for a couple of years. It is a residential area except for a concrete plant in the centre of it. The machinery made a lot of noise at night, as did the trucks moving in and out.

Mr. THRIFT: I might make a point in favour of zoning there. It is a sort of situation where adequate zoning controls, had they been established earlier, would have prevented that kind of development from taking place. It would prevent that kind of thing happening. Either you decide it is going to be industrial area and you accept the cement plant, or it is going to be residential and you don't have the cement plant. It is one or the other.

The CHAIRMAN: Chemical plants and oil plants are really types of plants you do not want in the centre?

Mr. THRIFT: Well, you do not want them close to where people have to live. They have their proper place and they realize that themselves; in fact, they would rather be elsewhere where they are not causing a nuisance. I have known many cases where industry has been in a very difficult position and people have complained about its operations. This is a thing that industry and business people do not like, and with perfectly good reason. I don't think any of us like to have people complaining about what we are doing, or the way in which we make our living, and this is what is happening to them. Therefore, zoning gets them in an area where they fit in and protects them in many ways from the kind of objection that can arise when two interests are incompatible. This happens even with industries. Some industries are very sensitive. For instance, in the processing of food products there must be no smell or smoke nuisance, because such products are so sensitive to these things, and they are pretty fussy about the kind of neighbours they have too. This leads to controlled industrial districts with definite boundaries wherein the industries themselves are vitally concerned with the rigidity of the controls under which they live because they want the protection.

Senator TAYLOR (*Westmorland*): What about these large shopping centres; what are they doing to business generally—I am speaking of the large cities, particularly? I am thinking of two in the west end of the city.

Mr. THRIFT: I cannot quote what the experience is directly. I could not tell you whether or not in the opinion of the business people in downtown Ottawa they consider these affect their business seriously here or not, and anything I say from here on is not in the light of any knowledge I have of the relationship between downtown Ottawa and the shopping centres out some distance. I do know, however, that in many cities this question has been discussed. In many places, in Broadway, for instance, from the standpoint of national concern, people from all over North America, early on in the development of shopping centres, not long after World War II, felt a great deal of concern—I am speaking of the downtown business people—about the development of these new shopping centres, and felt that it was going to hurt them badly. I sat in on discussions where they pointed out what they thought was going to happen and how bad this was for downtown, and therefore for the community as a whole. On the other hand, there were many people later on, in similar discussions, even from downtown who said, "Stop crying wolf. I am from downtown, I have one of the biggest department stores in downtown. Our volume downtown is rising, but we are also getting involved in putting up a place out in these shopping centres."

Because these places are getting bigger and there are more and more people with more purchasing power; and we cannot pack it all in one package, we have to have more places to do business.

Senator TAYLOR (*Westmorland*): That is actually taking place, is it not?

Mr. THRIFT: Yes. The cities are getting bigger. The market capacity is getting bigger, and we cannot expect to continue to pack it all in the same place. That was the argument, not from me but from people in the top echelon of business in the United States.

The CHAIRMAN: Do they encourage a sort of a ribbon sprawl of the city, these big shopping centres? The west end of Ottawa was referred to, and I have noticed that there are a lot of vacant business lots along Carling. It is not a residential street any more.

Mr. THRIFT: This sort of problem varies a great deal from city to city, depending on many things, one is the zoning that is established by the city. Usually these shopping centres have been developed in areas of new growth. When they provide adequate commercial facilities to serve those areas, then usually we find that zoning limits the commercial development to those sites, or perhaps two or three of them. But they get away from the string of commercial enterprises along the highway, with all the lines of traffic lights, and so on. First, it is not necessary; secondly, the concentrated commercial development is so much advantageous, both to the people who are using it and shopping in it, and to the people who are using the roadways. When there are not shops concentrated all along these routes, and people are starting and stopping, and going out and coming in all the time, then the route can be used for moving people. However, as I say, the situation is not the same in all cities, depending on whether they have established these centres, whether they are zoning the main commercial centres. In some cases they have not done this.

Senator BARBOUR: When you take over people's property, do you find that infringes on the Bill of Rights at all?

Mr. THRIFT: That is a sticky one, and I am not sure that I can answer it categorically. That is why a blunt statement was made in the brief, which was referred to by one of the senators, because we don't want to deceive anyone into thinking that this is a nice thing to fix something up, when there may be things involved in it affecting people's fundamental rights, because those rights are awfully important and have to be protected.

Senator BARBOUR: Well, you buy property, and I presume a lot of people agree with what you decide to pay for the property. On the other hand, when you expropriate some property you give about three times as much as perhaps you give the first people, don't you?

Mr. THRIFT: Well, this a matter of arbitration. It depends what government is carrying out the redevelopment, and if they find it necessary to expropriate, then the matter goes to a court which decides what is to be paid, and if in equity, "X" man is to get "X" dollars, that is what courts are for. It is not the arbitrary decision of any local government.

Senator BARBOUR: As a matter of fact, they always wind up with more than they would get in the first instance?

Mr. THRIFT: I am not so sure that that is always our experience. Mr. McDonald is in charge of our property.

Senator BARBOUR: I have had a little experience in expropriation proceedings in relation to public works on roads, and I found that we always had to pay more.

Mr. THRIFT: There have been many cases all over the country, I must say, where expropriation has been a pretty expensive business; I know that.

Senator TAYLOR (*Westmorland*): That might indicate that you were not fair with the people in the first instance.

Mr. THRIFT: Mr. McDonald has pointed out to me that the Bill of Rights has never been directly related to N.C.C. acquisitions.

Senator STAMBAUGH: It is not always true that you have to pay more in expropriation proceedings. I can quote you three instances with regard to the airport at Edmonton. Three different people refused to take what was offered to them and went to court, and all three lost; they got less than was offered them in the first place.

Senator HIGGINS: Was this in war time?

Senator STAMBAUGH: No, it was within the past two or three years.

Mr. THRIFT: I have seen that tendency more in Winnipeg. They did not do much in the 'thirties. But, during the twenties there were a few cases of where the city needed property for major traffic improvements—that is, a new road, particularly one that led to the Legislative Building. There was a lot of mixed up development. In any case, there were a few of these properties that went to expropriation, and at that time the city felt that it had to get its fingers badly burned because in the end it had to pay much more for that property than the property was really worth. By the time the city had gone through the expropriation procedure, and so on, the property cost it more.

That was in the twenties, but in recent years in connection with some of the property acquisitions which have been necessary for bridge connections and approaches, and things of that kind, the world has been discovered as being not so rough as it was, and the authorities found that when they had to go to expropriation with respect to some of these properties the courts have looked at the matter pretty fairly. The courts have understood that it is the taxpayers or the people of the community who are paying the bill, and if somebody decides he is going to get a bit of gold out of it then there is no reason why he should get more than his property was worth, which sometimes happened in the past. The courts have been pretty fair, and in the case of Winnipeg the thought has been that if somebody will not deal with the city on the basis of the real value of their property then the whole negotiation is stopped there, and the parties go to expropriation.

Senator SMITH (*Kamloops*): Mr. Chairman, I have some further questions in which I am very interested, but I hesitate to prolong this discussion if it is going to be at the expense of not hearing from Mr. McDonald. I feel that he has probably the answers to some of my questions.

Mr. THRIFT: Yes, I would think so. I would like you to hear him because without him I am not backed up at all.

The CHAIRMAN: Are there some questions you wish to ask of Mr. McDonald?

Senator SMITH (*Kamloops*): I thought we were going to hear from him anyway on this brief, and if we do then I think he may answer some of my questions.

Mr. THRIFT: Are you thinking of the appended briefs?

Senator SMITH (*Kamloops*): Yes.

The CHAIRMAN: Is it the one on Housing and Its Environments?

Senator SMITH (*Kamloops*): Yes. I have not analyzed that, but I see that it is entered under Mr. McDonald's name, and I thought it might cover the questions I jotted down while I was listening to Mr. Thrift.

Mr. THRIFT: Would you like either Mr. McDonald or myself to read this?

The CLERK OF THE COMMITTEE: This will be printed as an appendix to today's proceedings. It was prepared in January 1960 and not for the purposes of this hearing, but it was referred to in the brief.

Mr. THRIFT: Both of the appended documents were prepared in 1960—the one on Housing and Its Environment and the one on Analyses of Post-war Residential Subdivisions. We thought these were valid points.

The CHAIRMAN: Yes. Can Mr. McDonald give us an analysis of this?

Mr. McDONALD: Yes, Mr. Chairman and honourable senators. The purpose of attaching this brief was primarily to bring to your attention what we thought was some fairly interesting research to support the point of time in relation to community facilities and residential subdivisions. It was some fairly original research that was done here, and it is attached to the Analyses of Post-war Residential Subdivisions.

We looked at 22 subdivisions which had been built in the Ottawa area in the post-war period. We analyzed the time that these subdivisions had been registered, and then we found out how long after they were registered all the official legal and survey work was done, and how long afterwards such things as storm sewers, sanitary sewers, water service, curbs and sidewalks were actually put into the subdivision. Then we looked at some of the things which were important to the people living in those subdivisions, such things as playground developments, undeveloped land, churches, mail delivery and such things that make a community out of a subdivision. It was somewhat interesting to note the length of time that passed between the time when the plan was approved and the time when these other features became part of the subdivision. I think those figures strongly support the point that was made in the brief to your committee, Mr. Chairman, where it was said that Canadian children are growing up in these new subdivisions without complete community facilities.

Development of communities out of these residential subdivisions is certainly not keeping pace with the development at all, and we felt it would be of some interest to you to have the results of this research to substantiate this particular point. That is really the only purpose of this appendix, Mr. Chairman.

The CHAIRMAN: Are there any particular questions, Senator Smith, that you would like to ask Mr. McDonald?

Senator SMITH (*Kamloops*): No, but I will tell you what I was concerned about. While it is not strictly within our terms of reference I think it is a pretty common experience of all of us who come to Ottawa for part of the year to hear complaints about road conditions, sidewalks, street signs and many other things which in an ordinary city, which is not the capital and not within the National Capital Commission area, would be strictly a civic problem. That is why I asked where the regulations of the Ontario Planning Act end and yours begin.

I take it that everything that the Planning Act imposes on any urban community in Ontario it imposes here, but Ottawa, being the national capital, is a matter of interest to all Canadians, and I, for one, do not like to have Americans and other visitors come here and register complaints which you cannot very well defend the city against. I wonder to what extent the National Capital Commission has any control over these things. Is it in a position to correct some of these things that are unsightly, and not only unsightly but discreditable to the city, and which are not in keeping with what we expect and what visitors expect from the capital city of Canada.

Because there is a National Capital Commission I naturally wonder if there is a responsibility upon the Commission; whether it has authority to do something that it has not been doing to correct these things.

That is a pretty broad field, I know, and it probably is not strictly with the terms of reference of this committee, but as one who is interested in the impression our capital city makes on visitors it is a matter of vital interest to me.

Mr. THRIFT: Maybe I can say something on this. If I leave any gaps Mr. McDonald will block them up.

In respect to matters that have to do with streets, traffic and anything of that kind in the city of Ottawa then I can say it is the responsibility of the Corporation of the City of Ottawa under the statutes of the province of Ontario, and the National Capital Commission has no right and, therefore, no responsibility, to put its fingers into the city's affairs which are assigned to it by statute, or, for that matter, into the affairs of any other municipal jurisdiction in the capital region. Where we do have jurisdiction in the city is carefully defined, and with respect to those properties of the capital region such as parks, parkways, Government areas and so on we assume full responsibility. We are prepared to answer for what happens in those areas.

Mr. McDONALD: Mr. Chairman, I think this was quite exhaustively dealt with by the Joint Committee of the Senate and House of Commons which in 1956 looked into the Federal Commission activities. I think it is sufficient to say that the National Capital Commission as a federal agency has no control over land that it does not own. Therefore, everything in the realm you were dealing with is a question of liaison and persuasion.

Senator STAMBAUGH: Let us put it a little differently. For instance, on Wellington Street you might own properties and buildings on both sides of the street but the street is maintained by the municipality entirely.

Mr. THRIFT: That is correct.

The CHAIRMAN: Has the National Capital Commission the right to expropriate land in the Gatineau? Is that part of the green belt?

Mr. THRIFT: The Gatineau Park is a separate matter. It is not established as part of the green belt, although in effect part of the Gatineau Park might be considered as lying in the green belt. As I say, it has not been considered that way.

Mr. McDONALD: The Department of Justice has always held that the Commission has powers of expropriation in the National Capital region lying in the province of Quebec.

Mr. THRIFT: We have not exercised that.

Mr. McDONALD: Oh, yes, these powers were exercised for quite a number of years and then for a period they were not exercised. However, according to the Department of Justice those powers lie with the Commission.

The CHAIRMAN: If there are no further questions we will adjourn.

Senator STAMBAUGH: On behalf of the members of the committee I would like to express our appreciation to these gentlemen for appearing here today and making such a good presentation.

The committee thereupon adjourned.

APPENDIX "A"

HOUSING AND ITS ENVIRONMENT

Since 1945 the National Capital Commission or its predecessor, the Federal District Commisison, has been dealing with the planning and development of the National Capital. To this end plans have been prepared to guide the future growth of the metropolitan area, which include the cities of Ottawa and Hull and some 60 other municipalities in the provinces of Quebec and Ontario. During this 15-year period, the Commission has examined and re-examined many proposals and ideas which have been brought forth from time to time as a guide for the development of this area.

In considering housing, the broad aspect of metropolitan regional planning must be borne in mind and residential development related to this context. Housing and its environment is not an independent part of the metropolitan area but is affected by and affects such municipal services as sewer, water, storm drains, hydro, telephone, curbs and pavements, etc. It affects the street pattern, traffic flows and parking requirements and the location and type of commercial and industrial developments within the area. Above all, housing and its environment has a tremendous effect on the fiscal policies of the municipalities in which they are located. With education assuming such a large portion of the municipal tax dollar, the provision of schools and amenities to serve the people who live in the housing become paramount factors in considering the overall problem.

One of the major factors in considering housing is the tremendous scale of the problem. From 1945 to date, the population of Greater Ottawa has grown from about 250,000 to around 400,000 persons. By the year 2000 it is expected that the population in this area will approach 1,000,000 persons. Facing such figures, it is little wonder that every one responsible for housing has been striving unduly for quantity and accepting a minimum quality and that expediency has loomed so large in the consideration of the problem by our government and municipal authorities.

Another rather important consideration with respect to housing is the solution of the challenge of constructing housing in a free enterprise country. By taking advantage of the tremendous competitive drive inherent in such a system, satisfactory housing for all elements of the population can be erected in good communities properly located. However, controls must be applied by the authorities responsible to guide and police these developments in order to prevent shoddy workmanship in unimaginative surroundings. We must admit unchecked free enterprise has produced much standard housing for our people. All this dull and poor housing appears to be a waste of the country's stock of manpower and wealth; on the other hand Don Mills is indicative of what free enterprise can do in producing extremely fine housing in a good environment.

Possibly, municipalities must assume increased responsibilities to avoid wasteful practices which affect the tax rate and ensure that, irrespective of actual land ownerships, integrated and economic developments result. Inevitably this will require additional and competent staffs whose advice should be followed. It appears that public opinion as expressed by the elected officials is not keeping pace with the recognition of the problem, by the officials charged with administration in this field. Possibly too much publicity is being given to aesthetics and the social effects of poor housing and insufficient to the economic loss to the country of built-in obsolescence and improper environment.

Another matter which has been neglected is the study of the real requirements for housing in any period to ensure that in metropolitan regions development of land follows an orderly pattern and is not in advance of need. The ultimate requirement for residential land is based on the need for homes which, provided the economy of the region is reasonably buoyant, is in turn based very closely on the population increase. The population increase of a region for a short-term period can be predicted with a reasonable degree of accuracy and this increase or decrease could be allocated to its component municipalities. A fairly simple computation could yield the number of acres which will be required for development in any five year period. Is it unreasonable then, to say that to prevent excessive waste, only certain land will be developed in a given period? Should an owner decide that he does not want to develop his land during the specified period, the municipality might be given the right to acquire the land and develop it. On the other hand, if the land is so located that it will not hamper other development, the land can be left and the same area developed in another location.

This method will lessen urban sprawl but it has a weakness which must be controlled. Monopolistic control of the land which is ripe for development might develop, thereby forcing land prices to artificial levels. That this is a real problem is indicated by the effects of the Greenbelt on the price structure of land in the Ottawa region. Since the decision to acquire the Greenbelt was announced (which had the effect of removing some 30,000 acres from development), ownership of the land between the Greenbelt and the present city has changed hands to such an extent that a free market in land no longer appears to exist. The effect of restricting development on the price of land will depend on the real need for residential land which, as mentioned above, is based substantially on the population increase. To some extent, the effect on land value can be minimized by the development of more and better satellite communities, by providing building lots by land assembly schemes and by multi-family housing units being built in the centre of the city.

The problem facing us with respect to housing and its environment must be viewed in the terms of history. It is suggested that long-term effects of the environment are far more important than that of the housing itself. Some, indeed much of the postwar housing would appear to have a very short physical life (between 35 to 40 years) but inferior design and construction or improper location may make this housing obsolescent within 25 years of its erection. This is quite a different problem than that presented by the 1900-1930 housing, much of which had sufficient cubage to warrant conversion into multiple family housing. The typical postwar single family bungalow does not seem to provide the same flexibility for future use. If this new housing has a limited future use, then the trees, roads, sidewalks and underground services will be of value when the buildings have depreciated to such an extent that it may well be economic to replace them. Obviously, it is less wasteful to build housing having a longer life.

The time may have come that certain or much of our postwar housing should be viewed from the point of view of utilizing the developed land. This land could be used by housing with more families per acre or by other uses such as commercial, industrial and public use. Some subdivisions of vintage 1945-50 in Ottawa are already ripe for redevelopment since their location can be utilized for multi-family dwellings or for commercial and industrial purposes. Merely because the land is occupied by fairly recent housing should not limit the areas in which redevelopment takes place.

Sprawl results not only from disorderly development of small parcels of land but in the Ottawa area, at least, it results from the lack of proper housing for the lower income groups. Such persons have the choice of living in blighted or slum housing within the centre of the city or newly-built housing erected on the fringes of the city. Much of the latter is attractive since it requires a minimum down payment or has an apparently low rent but such housing due to lack of municipal control, frequently is built to minimum or below minimum acceptable standards. Another factor in the Ottawa region which appears to encourage this drive to the outskirts is the urge on the part of many new Canadians to own a piece of land. Many of these new Canadians buy a parcel of land before they have sufficient knowledge of the community in which they are locating to know whether or not they are actually making a wise investment. Often they do make poor purchases since Canadian conditions are different from those in their country of origin but this could easily be prevented by an educational campaign directed to the new Canadians before they come into the country.

Without doubt a major problem of housing which must be met is the clear definition of desirable housing and environment design standards for the regional areas of Canada. Housing satisfactory for Vancouver may not be equally suitable for Quebec City, for example, where the climate, people, and materials differ so markedly. To develop proper criteria, teams of designers within each region must be developed to ensure that local conditions are given sufficient weight in the design of the housing and its environment. These teams of experts should be made up not only of architects, engineers, landscape architects, etc., but also of social scientists and economists. Since the buildings devoted to amenities are the most likely of any part of a community to remain standing for an appreciable length of time, it is particularly important that parks, playing fields, schools, libraries and all such other facilities which make the difference between a group of buildings and a community, must be given the greatest attention. Municipalities, it would seem, are justified in spending adequate sums on such facilities since they will be used for very many years.

Landscaping of the houses and tree planting along the streets should be encouraged for they too are permanent features. In fact, trees should be planted as soon as a subdivision is developed since they, more than any other single factor, relieve the monotony of similar houses and unify the appearance of streets whose houses are diverse in appearance.

Since the housing environment is going to remain with us for a long time, it would seem to justify greater investments in the factors making up the environment itself. For example, underground wiring might be considered a fundamental part of the development rather than a luxury which can only be afforded under the most unusual circumstances. As well, the streets and curbs should be carefully designed to assist the appearance of the housing adjacent to it. Roads too, should be considered a permanent investment and built for long life rather than using temporary or light materials. In much of our postwar residential districts the roads are too lightly constructed and as a result of the climate and traffic, have required constant maintenance. Lamp standards, power poles, street signs and access ramps to cross the sidewalks should all be designed and built on the basis of a long life rather than as an expedient.

One interesting matter with which the Commission has had a certain amount of experience is the value of architectural controls. For many years, Island Park Drive has been subject to such control by the Federal District

Commission, now National Capital Commission, and the results have been unsatisfactory. This has resulted primarily from the change in taste in architecture over the 30-year period which was required to complete building on the street. On the other hand, since 1953 the Commission has controlled the appearance of a limited amount of housing in Hull adjacent to the entrance to Gatineau Park and certainly some of the worst features of uncontrolled development have been avoided. Roof colours, paint colours and materials have been harmonized and simplified.

A rather general problem is the number of important changes to the appearance of houses which were designed by architects and whose plans are sold as a packet. Many of such glaring errors can be prevented by architectural controls administered by a committee. Without doubt, the adaption by unskilled designers of such house plans brings about many of the more flagrant examples of awkward looking and poorly laid out houses. Thus, it is considered that committees of design are of great value in lifting minimum standards and this in itself is of value to the residential environment. One or two particularly discordant houses can spoil the appearance of a street comprising quite a number of houses.

Another area in which such committee can be of value is to insist on proper massing of housing in residential subdivisions. This is a phase of design generally neglected in large building operations but the insistence of such a committee in looking at the problem generally provides the cure.

In conclusion, the aforesaid comments are all made with the National Capital Region in mind and may or may not have general application. We believe that people in general want better housing in good environments at prices which fit their income. The provision of such accommodation can be achieved only by the co-operation of the public, of business and all levels of government.

D. L. McDonald,

*Director of Planning and Property,
National Capital Commission.*

January 14, 1960.

APPENDIX "B"

June 1, 1960.

Analyses of Postwar Residential Subdivisions. Metropolitan Area.
National Capital Region.

Display on exhibition at the Daly Building, February 1960.
Committee on the Quality of the Residential Environment.
Royal Architectural Institute of Canada.

In order to examine and report in detail on the state of postwar residential subdivisions in the Metropolitan Area would be a tremendous task. Therefore, it was resolved to present a cross-section of residential development by selecting 24 residential subdivisions for analysis. Five of the subdivisions were located in the Province of Quebec while the remainder—19—were located in Ontario.

Facilities Examined: The facilities examined were date of installation of central water, sanitary and storm sewer systems, paved streets, curbs and sidewalks, elementary public school with one mile public transit, public recreation areas—developed and undeveloped—within one mile, street trees, three religious institutions within two miles, house to house mail and express delivery.

Analysis: All the residential areas examined lacked at least one facility. Deficiencies were most common for curbs (21) sidewalks (18) paved streets (15) unsupervised playgrounds (19) developed local park (19) street trees (14) house to house express delivery (12) and storm sewers (11). On the other hand, churches and central water systems were available to all areas except for two.

The provision of the various facilities appear to be dependent upon:

1. Nearness to limit of builtup area of central city (Ottawa or Hull).
2. Size of lots—small lots versus small holdings.
3. Date and municipality construction of residences commenced.

Those areas located in suburban municipalities, annexed by the City of Ottawa from the Townships of Gloucester and Nepean or of recent construction—since 1958—generally ranked high in deficiencies. The two areas that were developed with the direct assistance of Central Mortgage and Housing Corporation had the least number of deficiencies.

The deficiency of curbs, sidewalks, and paved streets could be accounted for in part, by the lack of storm sewers. The lack of developed local parks may be related to the short time that has elapsed since the commencement of residential construction. Land for the future development of local parks has been reserved only in the City of Ottawa. The other municipalities have not reserved park sites even though playgrounds may be available.

The time lag for the different facilities varies from area to area. For those facilities that have been provided water and sanitary sewer is provided the same year as construction commences. Storm sewer is installed one to eight years after construction, paved streets one to two to four years after, sidewalks one to six years afterwards. Public elementary schools are usually available very soon after a number of dwellings have been occupied. The residential areas located more distant from the built up area have to wait two to four, or more years for schools, churches, and mail delivery to catch up. House to house express delivery is dependent upon 300 dwellings within a road distance of $\frac{1}{4}$ mile of the last limit of service before this is rendered. This explains why so many areas are not supplied with house to house express service.

ANALYSIS OF POSTWAR RESIDENTIAL SUBDIVISIONS

TIME REQUIRED FOR SUBDIVISION TO REACH MINIMUM DESIRED STANDARDS

	Pre-1945	1945-50	1950-53	1953-56	1957-60	Not Available
Approved Plan.....	3,4,9,14, 15,19.	1,11,12, 13,20,22.	2,4,6,8, 10,16,21.	7,18,23	17,24	
Commencement.....	—	11,12,13, 14,15,20, 22.	2,4,5,6, 10,16,19, 20.	3,7,8,9, 18,23.	17,24	
1. Sanitary sewer.....	—	1,11,13, 14,15,20.	2,4,5,20, 21.	3,6,7,8, 14,23.	12,15,16, 17,18,24.	9,10,19,22.

ANALYSIS OF POSTWAR RESIDENTIAL SUBDIVISIONS—*Concluded*
 TIME REQUIRED FOR SUBDIVISION TO REACH MINIMUM DESIRED STANDARDS—*Concluded*

—	Pre-1945	1945-50	1950-53	1953-56	1957-60	Not Available
2. Storm sewer.....	—	1,13.	6,20,21.	23.	5,7,8,10, 14,24.	3,4,9,11,12, 15,16,17,18, 19,22.
3. Water.....	—	1,11,12, 13.	4,5,6,20, 21.	3,7,8,14, 16,18,19, 22.	15,17,24	9,10.
4. Paved Streets.....	—	13.	1,2.	4,6,20,21.	7.	3,5,8,9,10, 11,12,14,15, 16,17,18,19, 22,24.
5. Curbs.....	—	13.	—	6,23.	—	1,2,3,4,5,7, 8,9,10,11,12, 14,15,16,17, 18,19,20,21, 22,24.
6. Sidewalks.....	—	13.	—	6,20,21, 23.	7.	1,2,3,4,5,8, 9,10,11,12, 14,15,16,17, 18,19,22,24.
7. Elementary Public School	4,5,8,10, 13,14,15, 16,19,23.	1,2,13.	6,11,22	3,9,17, 18.	7.	20,21,24.
8. Public Transit.....	3,4,10,14, 15,20.	1,2,8,12, 13,16,21, 22.	5,6,11,18.	23.	7,17.	9,19,24.
9. Supervised playground. within 1 mile	1,15,16, 20,21.	13.	3,4,5,6,8, 11,12,14.	2.	7,17,18.	9,10,19, 22,23,24.
10. Unsupervised playground. within 1 mile	—	—	—	4,5,6.	9,24.	1,2,3,7,8,10, 11,12,13,14, 15,16,17,18, 19,20,21,22, 23.
11. Developed local park within 1 mile	13,20.	—	—	16.	10,15.	1,2,3,4,5,6,7, 8,9,11,12,14, 17,18,19,21, 22,23,24.
12. Undeveloped local park within 1 mile	13.	—	6.	1,2,4,5,10, 11,12,14.	3,7,8,15, 16,17,18.	9,19,20,21, 22,23,24.
13. Street trees.....	—	13.	19.	1,6,11,12.	4,7,8,16.	2,3,5,9,10,14, 15,17,18,20, 21,22,23,24.
14. 3 churches within 2 miles.	1,2,3,4,5,6, 8,12,13,14, 15,16,18,20, 21,22,23,24.	—	—	11,19.	7,17.	9,10.
15. House to house mail delivery	—	1,13.	2,14,15, 16,21.	6,8,20.	3,4,5,7,11, 12,17,18, 19.	9,10,22,23, 24.
16. House to house express delivery	—	13,14.	20,21.	1,2,4,5,8.	6,16,17.	3,7,9,10,11, 12,15,18,19, 22,23,24.

MUNICIPALITY, NAME OF SUBDIVISION, INDEX NUMBER,
AND NUMBER OF DEFICIENCIES

Municipality	Name	Index Number	Deficiencies
City of Ottawa.....	Manor Park.....	1	4
“.....	Alvin Heights.....	2	5
“.....	Cummings Ave.....	3	8
Town of Eastview.....	Allen Blvd.....	4	4
City of Ottawa.....	Overbrook.....	5	5
“.....	Riverview Park.....	6	1
“.....	Elmvale Acres.....	7	4
“.....	Beaver St.....	8	5
Gloucester Twp.....	Blossom Park.....	9	14
City of Ottawa.....	Revelstoke Dr.....	10	11
“.....	Carleton Heights.....	11	7
“.....	Courtland Park.....	12	7
“.....	Veteran Village.....	13	1
“.....	McKellar.....	14	6
“.....	Midway Street.....	15	7
“.....	Glabar Park.....	16	5
“.....	Parkway Park.....	17	7
“.....	Copeland Park.....	18	8
Nepean Twp.....	St. Clair Gardens.....	19	11
City of Hull.....	Jardin MacKenzie King.....	20	5
“.....	Lac des Fees.....	21	6
Hull South.....	Lakeview Terrace.....	22	12
“.....	Glenwood Domaine.....	23	7
Town of Gatineau.....	Gatineau.....	24	11

JAN 2 - 1963



Fourth Session—Twenty-fourth Parliament

1960-61

THE SENATE OF CANADA

PROCEEDINGS OF

THE SPECIAL COMMITTEE OF THE SENATE

ON

LAND USE IN CANADA

No. 5

THURSDAY, MARCH 9, 1961

The Honourable Arthur M. Pearson, Chairman
The Honourable Henri C. Bois, Deputy Chairman

WITNESSES:

Dr. G. D. W. Cameron, Deputy Minister of National Health; and Dr.
Joseph W. Willard, Deputy Minister of National Welfare.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Higgins	Power
Basha	Horner	Smith (<i>Kamloops</i>)
Bois	Inman	Stambaugh
Boucher	Leger	Taylor (<i>Norfolk</i>)
Bradette	Leonard	Taylor (<i>Westmorland</i>)
Buchanan	MacDonald	Turgeon
Cameron	McDonald	Vaillancourt
Crerar	McGrand	Wall
Emerson	Méthot	White—31.
Gladstone	Molson	
Golding	Pearson	

(Quorum 5)

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

"The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Blois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—

Resolved in the affirmative."

J. F. MacNEILL,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

THURSDAY, March 9, 1961.

Pursuant to adjournment and notice the Special Committee of the Senate on Land Use in Canada, met this day at 11.00 a.m.

Present: The Honourable Senators:—Pearson, *Chairman*; Barbour, Basha, Gladstone, Golding, Inman, McGrand, Smith (*Kamloops*), Stambaugh, Taylor (*Westmorland*) and Turgeon.

In attendance: Mr. Ralph A. Stutt, Special Consultant to the Committee, and the Official Reporters of the Senate.

Dr. G. D. W. Cameron, Deputy Minister of National Health; and Dr. Joseph W. Willard, Deputy Minister of National Welfare, were heard and questioned.

At 12.30 a.m. the Committee adjourned to the call of the Chairman, tentatively set for Thursday, March 16th, 1961.

ATTEST.

James D. MacDonald,
Clerk of the Committee.

THE SENATE
SPECIAL COMMITTEE ON LAND USE IN CANADA
EVIDENCE

OTTAWA, Thursday, March 9, 1961.

The Special Committee on land use in Canada met this day at 11 a.m.
Senator ARTHUR M. PEARSON in the Chair.

The CHAIRMAN: Gentlemen, before we proceed to hear our witnesses this morning I wish to discuss our schedule for the balance of the session. Our program will be as follows. On March 16 we will have as witnesses Dr. Ernest Mercier, Deputy Minister, Department of Agriculture, of Quebec, and Professor A. Banting, Department of Agricultural Engineering, MacDonald College, Ste. Anne de Bellevue, Quebec.

On March 22, the committee will meet at 8 p.m. to hear Dr. W. J. Staples, Research Branch, Canadian Department of Agriculture, and Mr. S. F. Shields, Regional Director, P.F.R.A., of Swift Current, Saskatchewan.

I have written to Professor W. Baker, Centre for Community Studies, University of Saskatchewan, Saskatoon, to appear before the committee on April 19.

Senator BARBOUR: Do you think the Senate will have reassembled following the Easter recess by April 19?

The CHAIRMAN: We will have to take that chance. I don't know, but I have set the date for April 19 because we have a tight program for the balance of the session.

I have also invited Professor H. Van Vliet, of the Department of Farm Management, University of Saskatchewan, to appear at that time too. I had asked these two gentlemen to come on March 8th and 9th but they could not make it as they are very busy with their curricular work at the university.

On April 20th we will have as a witness Mr. H. A. Richardson, Chief Conservation Engineer, Department of Planning and Development, Toronto, Ontario.

I have given the date of April 26th to Senator Austin Taylor to make arrangements for a delegation from New Brunswick.

Senator TAYLOR (*Westmorland*): When the chairman spoke to me about this I felt that Mr. John Parker, who is in charge of the Maritime Marshland Rehabilitation Commission, might appear before us, together with a combined representation from the various provincial federations of agriculture and Departments of Agriculture for the Atlantic provinces. That is the basis upon which I contacted them, and I expect to receive word from them within the next few days.

The CHAIRMAN: I requested Senator Taylor to make these arrangements because we wanted to have a representation from the Maritimes with respect to soil and water conservation. The members of the Atlantic Provinces Economic Council found they could not do it. We endeavoured to arrange dates with them but when they got together they decided they could not make a presentation to us at this time. Incidentally, the sitting for April 19th will commence at 10 a.m., because we expect to have a long brief presented.

On April 27th we will have as a witness Dr. G. C. Russell, Experimental Station, Lethbridge, Alberta, and Mr. J. C. Wilcox, Research Station, Summerland, British Columbia, and Dr. C. C. Spence, of the Economic Division, Canadian Department of Agriculture, Edmonton, Alberta.

Dr. Spence appeared before the committee when Senator Power was chairman, but it is felt that he can give us quite a bit of information on irrigation and agricultural problems generally in the west that will be of some advantage to our committee.

Honourable senators, that is the program as far as I can see it. There is some chance of a brief being presented by the Department of Citizenship and Immigration but it is doubtful.

I had quite a discussion with Dr. Cameron, the Deputy Minister of Health, and Dr. Willard, the Deputy Minister of Welfare, both of the Department of National Health and Welfare, and they felt they could not give us a brief that would cover the whole of their department and thus give us something of advantage to our committee. They felt they could do better by making a statement to the committee, and then throwing the meeting open to questions. We tried to build up our programs so that we could get information from the Department of National Health and Welfare that would relate to the rural development program we discussed last year. Dr. Willard is not here yet. Would you care to begin immediately, Dr. Cameron?

Dr. G. D. W. CAMERON, Deputy Minister of Health, Department of National Health and Welfare: Mr. Chairman and senators, before attempting to prepare any kind of a brief I thought it might be better if I outlined the work we do which is of interest particularly to the rural areas, and then try to answer any questions there may be, with always the possibility that there might be something arise from this which could be put in the form of a paper to be of some use to your committee.

The situation in Canada as far as health is concerned is that it is a division of responsibility between the provinces and the federal government. There is some basis for this in the B.N.A. Act, but I think actually the present division of responsibility was as much as anything from pretty sound tradition, sound development and sound common sense in the division of responsibility. So much of health work is highly personal, and is best administered, I believe, and the provinces believe, as close to the individual as possible; in other words, by provincial departments of health and by municipal departments of health. This is the way public health works. It started in this country, and indeed the first minister of health in the British Empire was appointed in the province of New Brunswick. So you can see this is where community health work started. The federal government came into the picture at a later stage. That is the situation today, and you can divide the operations for practical purposes into federal responsibilities and provincial responsibilities.

I will dispose of the federal responsibilities and get them out of the way. They are the care of Indian and Eskimo; the maritime and aerial navigation quarantine, that is to say, the doctors and nurses who meet you when you come into the country; the care of sick mariners; and the operation of the Leprosy Act.

Now, there are certain other jobs that have been added which are purely federal responsibility. The federal department of health does the job. They very often have co-operation from the provinces, but it is a federal responsibility. I do not want to spend any more time on those, because I doubt if they have any bearing on the matter you are discussing.

I come back to the provincial responsibility, and in order to explain where the federal government comes into this I think I should say it has been the policy of the federal government, certainly in recent years, to say that whereas the primary responsibility for health rests with the provinces, nevertheless, the federal government feels it has a responsibility to assist the provinces with a view to ensuring a fair, even opportunity for good health services across the country.

Senator STAMBAUGH: Just as a matter of curiosity, is there leprosy in Canada?

Dr. CAMERON: Yes, sir, but very, very little. I think there are about five cases in hospital at the present time, subject to correction. Every now and then a case occurs. Very often they are people who have been away.

Senator GOLDING: Where is the hospital situated?

Dr. CAMERON: Tracadie, New Brunswick.

Senator McGRAND: Is there not another on the Pacific coast?

Dr. CAMERON: There was another on the Pacific coast which was closed.

Senator McGRAND: The one in Tracadie was the first?

Dr. CAMERON: It was the first, and Tracadie remains. It is a wing on an existing hospital operated by an order of sisters, and we pay it.

Senator BARBOUR: Have you been able to make any cures?

Dr. CAMERON: Just a few people are earning their living in various parts of Canada who have been brought to a point where they are no menace to anybody else. I hesitate to use the word "cure", I don't know, but they are earning their living.

Senator BARBOUR: They are able to leave the hospital?

Dr. CAMERON: They are able to leave the hospital and go back into the community and earn their living, and they are checked and followed carefully.

Coming back to the relation between the federal government and the provinces, in order to implement this policy of assistance, in 1948 the government introduced a system of health grants. For the current year the estimate, which you will find in the Public Accounts, is \$48 million. That amount or lesser amounts—in the early days the amounts were smaller—have been voted each year. There is no statute, it is an item in our estimates. It is specified under certain grants, that is to say, for certain purposes. One of them is assistance with hospital construction; another is to strengthen general public health arrangements; another is for child and maternal health, and so on. The list is available in the estimates.

The CHAIRMAN: May I interrupt a moment to introduce Dr. Willard, Deputy Minister of Welfare, of the Department of National Health and Welfare, who will follow Dr. Cameron, or possibly answer questions arising out of the present discussion.

Dr. CAMERON: I might mention now that the best picture of what the health grants are doing that you can get is in the Public Accounts—the section dealing with the Department of National Health and Welfare. There you will find many pages of detailed description of what is going on. It lists the various grants, lists the amount of money under each grant, and lists the amount of each of those grants which is apportioned to each of the provinces and to the two territories. Now, this money is for assistance in hospital construction. That is one item. It is for the promotion of health work in the provinces. I think it is fair to say that at the present time all the rural areas of Canada are part of a rural health unit of one kind or another. I think this is true. There may be areas where it is not true, but I do not think so. I think it has been covered.

To come down to your specific interest: If any province wishes to establish a rural health unit they lay down the plan, they employ the people, they lay down the rules, they specify the method by which it will be financed, and then they can turn to us and put forward a project set out in some detail. For example, if you want a health officer at so much salary, if you want certain public health nurses and other people, if you want certain equipment, and so on, you make a request to us that this money be furnished out of their share of general public health grants.

Senator BARBOUR: I notice that you speak of their wants. Are their needs as urgent as their wants, do you think?

Dr. CAMERON: I do not know how to answer that.

The CHAIRMAN: You in no case appoint an inspector of health, or the nurses?

Dr. CAMERON: No, sir. The management, the administration, is all done by the province. We don't appoint anyone, we don't order anything. What we can do is argue about a project. We can argue about a hospital construction project, and in the final analysis we can refuse. That power is inherent in this system. But I would hasten to say that we have had remarkably good co-operation with the provincial departments, and when we have arguments, the arguments are on a perfectly rational basis, and very often the argument ends up with a provincial fellow satisfying everybody that what he is doing is proper in the circumstances of the project under discussion.

Now, if you were to look in this annual report, Public Accounts, and I hesitate to ask anybody to dig into as formidable a report as this is, on page V-12, under the item hospital construction, some details are given. Take the case of New Brunswick. Assistance to that province was given during the year 1959-60 to a community health centre in Bathurst, to the Hotel Dieu de Saint Joseph in Campbellton. They are all listed here, with the amount of grant that was given. Now those are hospital construction grants and they are based on \$2,000 a bed depending on their capital outlay, plus certain other amounts which we can pay for other areas of the hospital that are not actually places where patients have beds.

Mr. STUTT: Dr. Cameron, could I ask you if each one of these projects is covered by agreement?

Dr. CAMERON: Each project comes to us all filled out in detail, from the province, signed by the Minister of Health of the province, or signed by the deputy minister. If they are major projects they are always signed by the Minister of Health. They put forward the specific sums of money as their share of the grants that will be devoted to this purpose. We examine it and if it comes within the rules of the Treasury Board for that grant, if there are funds available then I recommend it to my minister. If he signs it then the agreement is closed and the project comes into operation at that point.

Mr. STUTT: It is just a matter of allocating their share of the grant?

Dr. CAMERON: Yes.

Senator BARBOUR: I think you have been pretty generous with your grants to hospitals in Prince Edward Island in the last year or two.

Dr. CAMERON: I can only say that they have had their share of the total hospital construction grants and we have tried to meet their wishes. Some of the situations have been a little complicated but we try to meet their wishes.

Senator STAMBAUGH: At the start of the year do you allocate so much to each province?

Dr. CAMERON: Yes.

Senator SMITH (*Kamloops*): Is the formula used in calculating the grants based on a per capita basis? What exactly is the basis of arriving at these provincial shares?

Dr. CAMERON: There is a specific amount granted to each province.

Senator McGRAND: Is it not that in hospital construction it is a matching grant with the provinces?

Dr. CAMERON: Yes. It is a basic amount and per capita also; otherwise in the case of the province of Prince Edward Island they would be entitled to such a small amount that they could do nothing with it.

Senator McGRAND: In almost every case the grant is based on the fiscal needs is it not? Perhaps I should not use the term fiscal needs but rather local needs.

Dr. CAMERON: I am not sure that I understand your point, Senator McGrand. The local need is determined by the province but the amount we can pay is the same across the board. The allocation is basically per capita. There are one or two other elements that come into it—the Child and Maternal Health grant is governed to some extent by the infant mortality rate of the province, and the T. B. grant is influenced to some extent by the T. B. mortality rate in the province. The province with the higher mortality rate would receive slightly more. The request comes from the province. If the grant is approved the province is notified and it then starts to make expenditures and when they have got a receipted bill they send it in and we reimburse them. This is the basis—it is a reimbursement program.

Senator BARBOUR: Do you know the amount of the increase in 1960 expenditures over those for 1959?

Dr. CAMERON: The size of the grants are virtually the same.

Senator BARBOUR: Yes, but the amount of money that you paid out during 1959 is not the same as in 1960.

Dr. CAMERON: No, Senator Barbour, it is not. There is a clause in some of the grants which relates them to population. The general public health grant goes up in relation to the population increase. Two years ago the expenditure was about \$44 million and we are estimating an expenditure of \$48 million for this coming fiscal year.

Senator BARBOUR: That is for the fiscal year ending March 31, 1961 there will be an increase in expenditures of \$4 million over those of 1959. Thank you.

Senator SMITH (*Kamloops*): I am wondering whether there is a definite formula by which these allocated amounts are calculated. You just mentioned that the expenditure in 1960 will be \$48 million. Does one province obtain an advantage in securing grants based on its activity and the influence that the provincial department have on a situation in their own particular province. This activity is more highly organized in some provinces than in others. Some provincial Governments have more to do with the approving of construction of hospitals and so on, and in such a province they have probably reached a higher degree of organization than in some others. Does that province benefit from such activity on its part. I am thinking particularly of my own province of British Columbia where the provincial Government exercises a great influence on the construction and various phases of hospitalization. I would like to know if they are benefiting because of that, to a greater degree than a province which has not reached that stage of organization.

Dr. CAMERON: I think the answer to that one is that the amount of money available to a province—available—is fixed by a formula which does not change. That is to say because one province is more active than another it does not have more money made available to it. There is a fixed amount for each province based on the formula.

Senator SMITH (*Kamloops*): And that formula is a sort of a blended formula, I take it—a basic grant plus a per capita grant?

Dr. CAMERON: Yes.

Senator McGRAND: Is there any limit to the number of beds in relation to the population of a province? I can understand that one province might be very ambitious and might submit a program that would be equivalent to doubling the number of beds per capita of another province. Is there any regulation that controls that?

Dr. CAMERON: No.

Senator McGRAND: Suppose in the case of New Brunswick that they got very ambitious and requested grants which brought them a higher percentage of hospital beds per thousand of population than say in the province of Nova Scotia. Would you go along with the province of New Brunswick in providing those beds or would you say, "No, there is a limit, we cannot go beyond the level in the other provinces."

Dr. CAMERON: The thing that puts the brake on is the amount of money, their share of the hospital construction grant. If they try to go beyond that and build more hospital beds, we cannot go along with them.

Senator McGRAND: I had something to do with this in the old days. I think British Columbia was the first province that went into the hospitalization scheme. They had a problem. New Brunswick had been paying tuberculosis costs for a number of years and they had a problem that Ontario didn't have because they had not assumed the cost of hospitalization. I have forgotten how it worked but I was not aware that you had so many patients per bed. I have forgotten the ratio of beds per capita. Was it the same across Canada?

Dr. CAMERON: No.

Senator McGRAND: Does the urgency in the particular province have something to do with it?

Dr. CAMERON: I can only repeat that the number of beds per thousand varies quite distinctly across the country.

Senator McGRAND: Was it not six at one time?

Dr. CAMERON: In one province it would be seven and in another province it would be five and a half.

Senator GOLDING: When you started out in your program of providing hospital assistance to the provinces did you not depend on the province making representation to you with respect to hospitals being established in rural districts or in cities, and then you made a grant based on so much per bed?

Dr. CAMERON: It is still the same.

Senator GOLDING: They are talking about building a new hospital at Seaforth. I presume if they go ahead with that hospital they will get federal and provincial assistance?

Dr. CAMERON: The point is that if the province proposes to support that hospital and asks us to join in doing so, if there is money left in the hospital construction grant then we can support it.

Senator GOLDING: Let us suppose ten hospitals are to share all the available funds but five more hospitals want assistance. Would you not contribute anything to them?

Dr. CAMERON: No. The amount voted is specified in the estimates. That is the amount of money we have. We allocate it among the provinces according to the formula we have discussed. There are complexities in the hospital construction grant which do not occur in the others; that is to say, the carryover

principle is employed and the grant is made for five-year periods. This is because the undertaking of building a hospital stretches over three or four years. You get the idea to build a hospital and you look around for sources of support. You hire an architect, get your plans and you finally decide to go ahead. Then there is a period of construction and equipping, and so on, and it is finally ready. If the Government of Ontario asks for an allocation this year to build hospital "A" it knows perfectly well the hospital is not going to be built this year. It may not be built for three years. The Government of Ontario may say, "We wish to make a commitment against the amounts coming up each year for five years." That is how it is done. They can reach down to the end of the five-year period and the money will be carried forward in our estimates.

Senator GOLDING: I was under the impression that where the province okayed the establishment of a hospital and made their contribution to it at so much per room or whatever method they have, then automatically the federal Government would make a contribution to the same institution.

Dr. CAMERON: That would presuppose that this operates like a statutory item but it is not a statutory item. It is an item in our estimates each year.

Senator GOLDING: It would not be statutory because in some years you might have many more hospitals.

Senator McGRAND: When that amount of money is used up that is all there is for the year?

Dr. CAMERON: Yes.

Senator STAMBAUGH: If one province does not use its full allotment one year can that money be carried on into the next year?

Dr. CAMERON: Yes, that is where the five-year plan comes in.

Senator BARBOUR: Can the money be transferred to some other province?

Dr. CAMERON: No, senator.

Senator BARBOUR: In Prince Edward Island we have a fair share of beds per capita, and I would think your grants to our province would be much less in the years to come than they have been in the last few years.

Dr. CAMERON: It is to be remembered that this hospital grant is only a part of the scheme. In fact, as far as I am concerned the most interesting part relates to the other grants. For Prince Edward Island the main one is the general public health grant.

Senator BARBOUR: That is continuous. I was just referring to building.

Dr. CAMERON: In Prince Edward Island the assistance to the Sanitation Service, Provincial Department of Health, amounts to \$32,800; assistance to Public Health Dental Services Program, \$29,400; projects under \$10,000 total \$21,000. That is an overall total of \$83,000. A good deal of that is continuous. In New Brunswick there is assistance for Staff and Equipment for Public Health Nursing Service, assistance in training public health hospital personnel, assistance in purchase of poliomyelitis virus Salk vaccine, assistance to provincial laboratories for testing milk and water supplies.

When you are setting up county health units, rural health units, this is where the provinces get a good deal of assistance in training staff, hiring staff, providing equipment, and building local health centres, and so on.

I mention this specifically because it touches most closely on what the committee is mainly interested in. There is one other major item of assistance from the federal Government to the provinces, and that is the hospital insurance plan which is now in operation in all ten provinces and the two territories. Roughly speaking, what the federal Government does is pay half the cost of running all general hospitals, including the radiological services and the laboratory services in those hospitals. Those are the bare bones of the plan.

The formula by which we pay is such that a low-cost province gets a higher percentage of its cost paid out of federal revenue. The high-cost province gets less than half paid by the federal Government.

Senator McGRAND: Would you explain what you mean by high costs?

Dr. CAMERON: Well, the cost of operating a hospital per bed or per patient or by whatever method you want is higher, for example, in British Columbia than it is in Newfoundland. As a result of our formula the province of Newfoundland gets more than half the cost of its hospital program, and the province of British Columbia gets less than half the cost of its program, but nationally the federal Government is paying half and the provinces are paying the other half.

Senator GOLDING: I think it is pretty general that when the hospital insurance plan came into existence every hospital increased its per diem costs. As a matter of fact, I know of some hospitals that were in the red all the time. I suppose the federal and provincial governments keep them out of the red now. When the hospital insurance plan came into effect there was no effort on the part of the hospital boards to try to run things as economically as they could. May I say that I was chairman of the board for 21 years, and we did everything we could in the way of economy.

The CHAIRMAN: Honourable senators, I think we should concern ourselves by asking distinct questions, rather than making statements, because we are not arriving anywhere. We are thinking at the present time of our rural development program and what assistance the federal government can give the provinces in this program. Can either or both of these gentlemen give any technical advice to the provinces, in forming these rural pilot areas we anticipate building, with regard to the type of recreation or health standards needed?

Senator TAYLOR (*Westmorland*): May I ask a question? I recall at the time that Dr. McGrand was minister of health in New Brunswick, that about the time he vacated that position he had in mind a rural health plan, and I am just wondering if he would care to ask Dr. Cameron or Dr. Willard if that would come under the present rural development plan.

Senator McGRAND: Perhaps there is a little confusion there. The plan I had in mind was to make use of certain facilities to look after people in their homes rather than putting them in a hospital. I called it an hospital extension service, for persons in say, the city of Fredericton who needed some care. That thought came to me because at that time the Victorian Order of Nurses was in danger of declining, and Mr. Justice Locke, of the Supreme Court of Canada, who was chairman of the V.O.N., asked that each province give financial assistance to the V.O.N. I thought that would enable the V.O.N. to fulfill its mission of looking after people in the home, and at the same time save people the expense of going to hospital, while the Red Cross could do its work in the rural districts. Now everybody is entitled to hospitalization, and there will not be the need for people to stay at home, because they have their hospitalization paid for and are going to make use of the hospital. Nevertheless the need for nursing in the home is still present. Before people were entitled to hospitalization they had to pay to go in hospital. So I do not know whether you could get much public support for that sort of program now.

Now, I want to ask one question, and it can be answered now or a little later. There are in the province of New Brunswick, as well as in many rural districts across Canada, places where there is no hospital, but there is a resident doctor. In most of such places there is some sort of nursing home which has grown up over the years, where some capable woman or a practical nurse, qualified in some degree, looks after sick persons, say confinement cases. Under the present set-up, in a community where there is no hospital the people are

not going to go into that nursing home and pay their own way, and the doctor is compelled to take them perhaps 35 or 40 miles to a standard hospital to be looked after. However, people say that they will not pay their way to go that distance. The result is that it is a great inconvenience to certain medical men to practice in rural communities, and for that reason certain rural communities cannot get a doctor to stay there. I know of some places in New Brunswick that when the present doctor leaves the scene there will not be a doctor to practice there, because there is no hospitalization available. Is there any provision under the present hospital insurance scheme by which a community could have a low cost maternity hospital, costing probably not more than \$7 a day? As you know, the rates in a standard hospital are around \$17 or \$18 a day.

Dr. CAMERON: The act covers hospitals. The definition of "hospital" is to a large degree up to the province, and I am sure you will appreciate that you run into an administration gimmick when you start pointing to certain places and saying this is a hospital, and this one is not. All the provinces are considering this sort of thing very carefully, and there is a disposition to use certain types of facility in one area which they would not use in another, because there are perfectly good regular hospitals available. I do not like going beyond that, because it is up to Dr. Melanson, and the rest of them, to see if they can work out a plan which they can administer and hold to province wide.

Senator McGRAND: But if the provinces of New Brunswick and Nova Scotia, we will say, were to develop a plan to make available a small hospital with two or three beds, which gave a good standard of care, if that could be organized and the province would accept it, then your federal administration would go along with it, provided they approve it, is that right?

Dr. CAMERON: Sir, we would give it sympathetic consideration.

Senator TAYLOR (*Westmorland*): I would like to know more about this pilot idea of rural health services that has been mentioned. Could we have a clear-cut explanation of just what that service means in rural areas.

Dr. CAMERON: I am not sure that I understand your question, sir.

Senator TAYLOR (*Westmorland*): You referred, and so did the chairman, to the pilot areas you are creating.

The CHAIRMAN: No, we were not creating it. Under our rural development program we discussed last year the idea was that we would set up a pilot area if this rural development program took hold.

Senator TAYLOR (*Westmorland*): Oh, I am sorry, I misunderstood.

Dr. CAMERON: There are pilot projects of one kind or another, of course, and there are studies going on as to home care, the sort of thing Senator McGrand was speaking of.

Senator INMAN: In the little town in which I live we have a nice little hospital, but since hospital insurance came in it has raised one problem. It seems to me that we should have something in the way of a convalescent home in connection with it. We have only about 25 beds, and sometimes there is an urgent call for new patients to get in. It seems to me that sometimes patients could leave the hospital and convalesce somewhere else where it would not be so expensive, and make room for others.

Dr. CAMERON: The act encompasses not only general treatment in hospitals, but also chronic and convalescent hospitals, and this is an area the provinces are exploring and moving into very cautiously, because you can really understand this brings you to a difficult point where you must draw a line between a chronic and convalescent hospital and a home custodial care institution.

Senator INMAN: What brought this to my mind is that we had 7 cases where people were occupying beds, and others wanted to get in and couldn't. Those people occupying the beds could not be sent home without somewhere to go.

Dr. CAMERON: This is well recognized, and that is why the bill was drafted that way to include chronic and convalescent hospitals. Perhaps I might mention the question of costs. One of the reasons why the cost appears to be up is that before hospital insurance came along the insurance per diem cost of hospitals was jumping 8 per cent to 10 per cent a year. Secondly, when hospital insurance came along, the per diem rate changed, because from then on it included laboratory and radiological services which were not included before.

The CHAIRMAN: That explains the point you raised, Senator Golding.

Mr. STUTT: Mr. Chairman, might I ask Dr. Cameron this question: One of the categories you mentioned for which grants are available is general public health. Does that include community sanitation and community water supplies?

Dr. CAMERON: No. We take the position that this is for the assistance of health departments and as you well know the capital outlay for public water supplies, sewage disposal and so forth are beyond the jurisdiction of the health department. We can supply a sanitary engineer, we can train a sanitary engineer, we can train a technician to supervise the quality of the water supply, we can do a lot of things like that that surround the central job of water supply and sewage disposal facilities.

The CHAIRMAN: Does the federal health department have anything to do with preventing the pollution of rivers and streams, or is that strictly within provincial jurisdiction?

Dr. CAMERON: I wish I could answer that in a clear-cut way, Mr. Chairman, but I cannot. I know of no legislation which gives us authority to take action with regard to pollution in waters, that is, no direct legislation.

Senator McGRAND: That would be up to the local boards of health, I presume?

Dr. CAMERON: I would not like to be quoted on this, Mr. Chairman.

Senator TAYLOR (*Westmorland*): Has the fisheries department not some jurisdiction?

Dr. CAMERON: They have some legislation, yes.

Senator TAYLOR (*Westmorland*): I know in one particular instance that department stopped a cheese factory from putting its refuse into a stream.

Dr. CAMERON: Yes, and they can stop sawdust from being dumped into a stream.

The CHAIRMAN: Is that the federal fisheries department you are referring to?

Dr. CAMERON: I am not quite sure, Mr. Chairman.

Senator BARBOUR: I would say that we are better prepared to take care of the fish than we are of humans.

Dr. CAMERON: That was said at the time of the upset over the North Saskatchewan River.

The CHAIRMAN: Dr. Willard, have you anything to add to what Dr. Cameron has said?

Dr. J. W. Willard, Director, Research and Statistics Division, Department of National Health and Welfare, Ottawa: Mr. Chairman, the welfare side of the department I do not think has been very pertinent to the work of the committee. Perhaps I could just mention the responsibilities there. We administer

old age security, family allowances directly as a federal legislation, and we deal with the provinces who administer programs for old age assistance, disability allowances, blind persons allowances, unemployment assistance. In other words our grants in aid programs seem analogous to the kind of program that Dr. Cameron has been mentioning on the health grants they administer in a little different way, but we do have agreements with the provinces and they are responsible for carrying out the income test or means test, as the case may be, of the recipients, and determining how much benefits they should receive and we in turn reimburse the province for our share of the cost. In addition to that we are involved of course with the civil defence college which has to do with looking after the operation of that facility and civil defence welfare and finally we do have a consultant in fitness and recreation and this is an area where, it is conceivable, we might be able to be of some assistance to your committee.

Some years ago the department did administer a physical fitness act. We did have grants in aid amounting to \$225,000 a year which were administered on a project basis. That act was repealed, and along with its repeal not only did the monetary provision for grants in aid to the provinces disappear but also the national physical fitness council, which was made up of citizens from across Canada who acted as advisors to the minister on matters of fitness and recreation. The division of physical fitness, which services the administration of this act, the grants made and so forth, was cut back and reduced to a consultant in fitness and recreation along with a secretary. So that when the provinces have questions relating to the development of programs in this field they get in touch with us. Sometimes it may be universities, it may be in connection with programs that the provinces are planning to put on in this field. They will ask our consultant to participate. Dr. Clewes is that consultant. She has been working on a number of research projects. For instance, she has done a great deal of work on this air force bulletin on physical fitness. The basic material in that book was developed by Dr. Clewes and that is the kind of thing that she does. If in your work on rural development, Mr. Chairman, a certain amount of community planning were involved, and if the community sought advice from the province and the province saw fit to ask our consultant to make suggestions she would be available, but it is only on that basis. In other words, we do not go out looking for work, our channel of communication is with the province. But we act as a supplement and a support to them.

There are other recreational programs being carried out by the federal Government and you will probably come across those in your discussions with other departments. For instance the Department of Labour under its winter works projects has been giving a very considerable amount of financial aid to recreational programs. I noticed the other day that many municipalities that have put forward projects have been building swimming pools, for instance, developing parks and other kinds of recreational areas. That, I would take it, you would canvass with the Department of Labour. In addition to that, the Department of Northern Affairs is also working in this field of Resources for Tomorrow, and in that area they are dealing with the field of recreation. We have been participating with them on that through an interdepartmental committee which has been set up, and they are involved in that department with the national parks and all that involves in terms of development of recreation. Those, Mr. Chairman, cover, roughly, the various spheres on the welfare side.

In addition we have an administration branch which services both the health branch and the welfare branch, and from time to time certain projects come up in both the health and welfare fields where provinces ask us for assistance and where we may use our information services division or our research and statistical division. As was said a few moments ago about the

question of hospitals, the project and research division became involved to carry out a survey of hospitals in one province and in that regard that division did get involved in a question of public health centres and their function in rural areas. I think over the years we have had a considerable number of projects where the province has asked the research division to do a specific assignment for them or to work along with them. Before any health grants were made a province-wide survey of health services, hospital facilities, and so on, was carried out. Into this was dovetailed a construction survey, so that a complete survey of all hospital facilities was carried out in 1948-49-50, and our program was related to that master plan.

It is still provided under hospital construction grants that a particular project must not only fit into the needs of a particular community but also into the overall requirements within the province, so that you do not get into a situation such as was mentioned by Senator Golding where one community has its hospital completely left out while another one is in. In other words, when the province submits its project to the federal Government it has taken into consideration the overall needs and it is not a question of one being in and one being out.

The CHAIRMAN: Thank you very much, Dr. Willard. What I gather from the evidence presented here this morning is that the Rural Development Program must originate in the provinces. The federal Government and its departments, particularly the Department of National Health and Welfare, are co-operating with the provinces to bring forward an improvement in health and recreation. In other words, they are associated in their dealings right across the dominion in this work. It is just a matter of whether the provinces want to go into rural development programs. These programs started in pilot areas in the United States and then the United States federal Government came forward, when asked, to give them assistance. I gather from what has been said here this morning that the federal Department of Health and Welfare is willing to go along with this idea.

Senator McGRAND: What percentage of the hospital cost in New Brunswick is paid by the federal Government, 60 per cent?

Dr. CAMERON: Under the Hospital Insurance and Diagnostic Act?

Senator McGRAND: Yes.

Dr. CAMERON: I would think it would be something less than 60 per cent.

Senator McGRAND: I think we are the second highest in Canada. Newfoundland is first and New Brunswick is second.

Dr. CAMERON: I would not be sure of the figure but I think it is close to that.

The CHAIRMAN: Are there any other questions? We have enjoyed an enlightening discussion this morning.

Senator GOLDING: I would move a vote of thanks to Dr. Cameron and Dr. Willard for appearing before the committee.

The CHAIRMAN: Yes.

The committee adjourned.

JAN 2 1963



Fourth Session—Twenty-fourth Parliament

1960-61

THE SENATE OF CANADA

PROCEEDINGS OF

THE SPECIAL COMMITTEE OF THE SENATE

ON

LAND USE IN CANADA

No. 6

THURSDAY, MARCH 16, 1961

The Honourable Arthur M. Pearson, Chairman
The Honourable Henri C. Bois, Deputy Chairman

WITNESSES:

Dr. Ernest Mercier, Deputy Minister of Agriculture of the Province of Quebec; and Professor Angus Banting, Chairman, Department of Agricultural Engineering, Macdonald College of McGill University.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Higgins	Pearson
Basha	Horner	Power
Bois	Inman	Smith (<i>Kamloops</i>)
Boucher	Leger	Stambaugh
Bradette	Leonard	Taylor (<i>Norfolk</i>)
Buchanan	MacDonald	Taylor (<i>Westmorland</i>)
Cameron	McDonald	Turgeon
Crerar	McGrand	Vaillancourt
Emerson	Méthot	Wall
Gladstone	Molson	White—31.
Golding		

(Quorum 5)

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

"The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Blois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—
Resolved in the affirmative."

J. F. MacNEILL,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

THURSDAY, March 16, 1961.

Pursuant to adjournment and notice the Special Committee of the Senate on Land Use in Canada met this day at 11:00 a.m.

Present: The Honourable Senators:—Pearson, *Chairman*; Barbour, Basha, Golding, Inman, MacDonald, Smith (*Kamloops*), Stambaugh and Turgeon.

In attendance: Mr. Ralph A. Stutt, Special Consultant to the Committee and the Official Reporters of the Senate.

The following witnesses presented briefs and were heard and questioned:—

Dr. Ernest Mercier, Deputy Minister of Agriculture of the Province of Quebec; and Professor Angus Banting, Chairman, Department of Agricultural Engineering, Macdonald College of McGill University.

At 12:30 p.m. the Committee adjourned to the call of the Chairman, tentatively set for Wednesday, March 22, 1961, at 8:00 p.m.

Attest.

James D. MacDonald,
Clerk of the Committee.

THE SENATE

SPECIAL COMMITTEE ON LAND USE IN CANADA

EVIDENCE

OTTAWA, Thursday, March 16, 1961.

The Special Committee on land use in Canada met this day at 11 a.m.

Hon. ARTHUR M. PEARSON in the chair.

The CHAIRMAN: We have a quorum, honourable senators, and it is now 11 o'clock, so I think we should commence.

We have with us this morning Dr. Ernest Mercier, Deputy Minister of Agriculture of the province of Quebec. We are very fortunate in having Dr. Mercier here, and this is the first time, I think, since I have been chairman that we have heard from a representative of the Quebec Government.

Also present is Professor Banting from Macdonald College, who will present a brief.

I will now call upon Dr. Mercier to present his brief.

Senator STAMBAUGH: Mr. Chairman, I wonder if before the speakers begin they should give us a little information as to their backgrounds?

The CHAIRMAN: Yes. Would you do that, Dr. Mercier?

Dr. ERNEST MERCIER, Deputy Minister of Agriculture, Province of Quebec: Mr. Chairman and honourable senators, as to my background I will say that I was born in the province of Quebec and I studied at Laval university. I then went to the States, to Cornell university, and on returning I worked for three years in the Department of Agriculture, province of Quebec. I then joined the Civil Service of Canada and was there for ten years, and then I returned to the province of Quebec last August after a short stay of two months at Macdonald College as Chairman of the Animal Science Department.

It is with a great deal of pleasure that I accepted your invitation, Senator Pearson, to come here and talk about drainage. I consulted my colleague, Professor Banting, and we decided to present separate briefs. My brief will deal mostly with drainage, properly speaking, and his brief will be a little more general. Because it deals with the two phases of water management, namely, drainage and irrigation.

HISTORICAL REVIEW

Drainage seems always to have been one of the chief concerns of the Department of Agriculture, but it was about 1912, when a policy of tile drainage was adopted, that this interest was really expressed.

Sub-Surface Drainage

The policy provided for reimbursement to farmers of 50% of the total cost of sub-surface drainage works, including transportation costs and cost of tile, which then amounted to \$19, \$25 and \$50 per thousand feet for tiles of three, four and six inches in diameter, respectively.

This aid was very much appreciated, and there were so many applications that the Department decided, that same year, to buy two mechanical diggers.

These were placed under the direction of the Agricultural Colleges at Oka and Sainte-Anne-de-la-Pocatière, and the Department also requested these institutions to train technicians in the drawing up of preliminary plans and the carrying out of projects.

It would appear that Macdonald College had already taken the initiative in this field, since the first professor appointed to teach these courses came directly from Sainte-Anne-de-Bellevue.

After having been used for some time for demonstration purposes on the farms of the institutions to which they had been assigned, these drainage machines were subsequently employed on projects here and there throughout the Province, but particularly in the counties of Pontiac, Quebec, Portneuf, Montcalm, Châteauguay, Laprairie, and Iberville. They were finally sold to private individuals, one of whom, Senator Donat Raymond, used the machine to drain his farm at Vaudreuil in 1918.

Towards the end of the first world war, when help and materials were scarce, farmers seemed somewhat less interested in drainage. There was, however, a renewal of activity about 1919 and 1920 but it did not last.

The Department bought a new machine for carrying out drainage projects at the Provincial Farm-School at Deschambault and subsequently, over a period of a number of years, placed it at the disposal of farmers. The machine was also ultimately sold to a private owner.

Interest in tile drainage was renewed about 1943. The Department bought a new machine, but scarcity of tile and shortage of labour, and the additional difficulty of getting spare parts for repairs, prevented this policy from having really widespread effect until about 1950.

The Department now has six of these machines, but they are not really enough and it is proposed to add to their number, which should be doubled to cope with the many requests.

Surface Drainage

During the difficult years which followed the first world war, the Department of Agriculture gave greater encouragement to surface drainage, granting subsidies to municipalities for improvements to watercourses. By this time labour was plentiful, but money was scarce. The subsidies apparently meant a great deal to the farmers.

It was during these years—to be exact, in 1930—that the Department bought its first four power shovels. These were made available to municipalities at a charge of one dollar per hour of effective work. The number of these machines has been gradually increased, so that the Department had 9 power shovels in 1935, 27 in 1944, and 37 in 1960.

This assemblage of equipment is completed by 14 compressors for blasting work, and 21 bulldozers used for spreading excavated material.

Farm Land Improvement

There is another operation which is so closely connected with drainage that it must be mentioned here. This is the use of bulldozers for farm improvements such as levelling land, mounding ridges—which we call in French “arrondir les planches”—smoothing ditch banks, removing rocks, etc. As a matter of policy, the Department began to lend aid to such improvements by means of some of its tractors in 1943. However, the number and scope of these improvements soon outstripped the capacity of the government's equipment and the Department therefore gradually delegated the work to private enterprise under contract.

Drainage Problems

Drainage problems in the Province of Quebec are much the same as those faced by other provinces which have a similar topography. In the valleys the slope is nearly everywhere very gentle and, in some cases, entirely lacking. This makes it necessary to create artificial slopes, with the result that watercourses sometimes reach considerable size.

In the case of other regions, such as Abitibi and part of Temiscamingue, for example, where the soil breaks down easily even though the land is quite flat, it is important that all drainage projects be carefully studied beforehand, otherwise they may eventually lead to erosion and cause a simple line ditch to become a ravine.

Finally, where slopes are steep, it sometimes becomes necessary to undertake certain protective measures in order to prevent watercourses from widening and sometimes even completely changing course.

Drainage Requirements

There is considerable need for drainage in the Province of Quebec. The fairly abundant rainfall renders a quite considerable part of the land unfit for cultivation, except in so far as it is provided with a system of watercourses for the removal of surplus water, particularly in periods of marked excess. Such drainage systems are supplemented by the practice of working the soil up into mounded ridges, a method which has been widely adopted for field crops.

Nevertheless, this system of drainage is not complete, and farmers who cultivate their land intensively are now resorting more and more to tile drainage for the encouragement of which the Department of Agriculture makes annually growing provision in its budget.

SUB-SURFACE DRAINAGE

Farmers are becoming increasingly convinced that they must resort to tile drainage in order to reap maximum yields at lower cost.

At present, the assistance provided by the Department of Agriculture is limited to (1) drawing up preliminary plans, free of charge, for the work, (2) reimbursing the cost of transporting drainage tile, and (3) making trenching machines available to farmers.

(a) Drainage plans and technical advice

For farmers who wish to improve the drainage of their land by the use of tile, the Department provides the free services of competent personnel. These technicians visit farms on request to inspect fields which it is proposed to drain give the applicants the information they require, and prepare plans for the work.

(b) Transportation of drainage tile

The Department refunds the cost of transporting tile, from factory to destination point, taking as a basis the freight rate per box-car load (minimum 50,000 pounds). Last year, farmers bought 1,054,400 feet of tile and the Department paid \$25,725.07 for transport.

(c) Drainage machines

The Department now has six trenching machines which are rented to farmers for the nominal charge of one dollar an hour of effective work for machine and operator.

In 1959, with five machines at its disposal, the Department dug 503,117 feet of trench at a cost of \$47,801.50. The cost of the Department per hundred feet was \$9.50 and, to the farmer, only 68¢.

Last year, the six machines dug 680,313 feet of trench but calculation of the cost will not be finished until the end of the fiscal year on the 31st of March 1961. (See table 1).

MUNICIPAL WATERCOURSES

The Department provides municipalities with all the assistance they need for the preparation and maintenance of municipal watercourses, in return for a small contribution of \$200 per linear mile. This applies to watercourses made with the help either of government equipment or of private enterprise.

The Department also grants subsidies to municipalities for the upkeep of smaller watercourses, that is to say those which do not entail the use of heavy machinery.

(a) *Surveying*: Specialist engineers locate watercourses, take levels, prepare plans and estimates taking into consideration the extent of the drainage basin, and map out a new course if necessary, eliminating bends so as to give the channel its maximum discharge.

(b) *Work done with Departmental equipment*: The Department of Agriculture has an assemblage of equipment, including 37 power shovels, 14 compressors, and 21 bulldozers, all of which is set apart solely for projects for the improvement of watercourses.

The full report on the work carried out in 1960 is not yet completed but, in 1959 on a slightly smaller budget, the Department improved a total length of 260.1 miles of watercourses, costing \$698,741.12.

(c) *Work done by contract*: Since the Department has not sufficient equipment to cope with all the applications received, it lets out work to contractors. These, in 1959, improved 595.7 miles of watercourses at a cost of \$9,613,990.27.

The total length of watercourses improved in 1959 was thus 855.8 miles, and the cost was \$10,312,031.39.

(d) *Small watercourses*: For work on small watercourses, the Government grants to municipalities subsidies amounting to 75% of the total cost of the project in pioneer districts, and 50% of the cost elsewhere. The amount of subsidies granted for this purpose in 1959 was \$214,872.58 and the length improved was 188.4 miles. (See table 2 appended).

FARM IMPROVEMENT

The Department grants a subsidy of \$5 an hour to farmers who wish to improve their farms with the help of bulldozers, up to a limit of 10 hours per farm per year.

Such works of improvement—comprising levelling, rounding-off ridges, smoothing ditch banks, clearing rocks, etc.,—are, for the most part, let out on contract to private enterprise by the Department.

In 1959, 42,800 farms benefited from such improvements, at a cost to the Department of \$1,900,096.41. (See table 3).

TABLE I
DEPARTMENT OF AGRICULTURE—PROVINCE OF QUEBEC
DRAINAGE SERVICE—THE DRAINAGE DIVISION
Report of activities—1951-1960

Year	TECHNICAL WORK			MECHANICAL WORK			TRANSPORT OF DRAINAGE TILE		
	Requests	Visits	Plans	Machines	Length dug (in feet)	Interested parties	Total cost of operations	Cost per foot	
								to Department	to farmer
							\$	\$	\$
1951.....	77	77	18	2	190,402	24	11,705.62	0.0615	0.0078
1952.....	135	135	15	2	201,359	30	13,446.53	0.0678	0.0075
1953.....	146	146	35	2	208,875	42	21,036.89	0.1007	0.0063
1954.....	137	137	42	2	238,983	59	17,951.47	0.0751	0.006
1955.....	179	179	30	3	312,553	84	25,773.81	0.0824	0.0058
1956.....	181	181	35	3	269,002	95	18,934.47	0.0702	0.0069
1957.....	190	186	39	4	292,360	89	27,310.24	0.0948	0.0074
1958.....	160	160	60	4	414,305	40	30,334.14	0.0732	0.007
1959.....	148	148	50	5	503,117	70	47,801.50	0.095	0.0068
1960.....	331	187	98	6	680,313	112	—	—	—

Quebec, the 8th of March 1961.
UJ/AM.

TABLE II
DEPARTMENT OF AGRICULTURE—PROVINCE OF QUEBEC
DRAINAGE SERVICE
Report of activities—1950-1960

Year	SMALL WATERCOURSES			LARGE WATERCOURSES				
	Grants			with Departmental equipment		by contract		
	Length (in miles)	Cubic yards	Cost \$	Length (in miles)	Cubic yards	Cost \$	Length (in miles)	Cubic yards
1950-1951.....	92.5	241,587	84,992.06	203.8	1,524,870	468,484.45	127.2	1,890,335
1951-1952.....	109.2	279,284	61,385.95	234.6	1,723,850	509,546.13	236.5	2,615,277
1952-1953.....	154.0	403,648	97,141.07	234.2	1,739,126	526,967.26	326.7	3,040,545
1953-1954.....	130.0	240,088	120,125.17	252.2	1,737,180	604,133.44	273.1	2,452,553
1954-1955.....	122.1	354,630	141,320.97	234.3	1,601,646	562,074.22	284.1	2,242,456
1955-1956.....	205.5	579,205	204,310.15	286.9	1,695,446	643,341.57	395.0	3,538,270
1956-1957.....	223.8	691,885	209,740.42	281.1	1,787,429	628,346.98	589.9	4,789,513
1957-1958.....	158.4	490,764	176,231.33	261.0	1,639,800	630,223.27	512.4	3,830,770
1958-1959.....	148.0	509,339	183,494.80	266.2	1,530,327	628,833.01	482.3	4,439,174
1959-1960.....	188.4	646,041	214,872.58	260.1	1,486,538	698,741.12	595.7	6,403,939

Quebec, the 8th of March 1961.
UJ/AM.

TABLE III
DEPARTMENT OF AGRICULTURE—PROVINCE OF QUEBEC
DRAINAGE SERVICE—FARM MACHINERY DIVISION
Farm Improvements—1950-1960

Year	WITH DEPARTMENTAL EQUIPMENT			BY CONTRACT			Total cost
	Tractors	Farms	Cost	Tractors	Farms	Cost	
1950-1951.....	4	315	19,597.50	387	25,435	582,614.47	602,211.97
1951-1952.....	5	358	26,894.00	394	21,870	547,023.34	573,847.34
1952-1953.....	5	272	24,057.00	469	24,287	818,016.96	842,073.96
1953-1954.....	3	339	35,587.50	425	23,543	769,684.22	805,271.72
1954-1955.....	3	209	24,458.50	502	26,524	874,885.13	899,343.63
1955-1956.....	5	129	35,887.00	560	32,281	1,097,301.75	1,133,168.75
1956-1957.....	4	161	19,723.00	585	30,736	1,068,162.51	1,087,885.51
1957-1958.....	1	95	9,312.00	603	36,794	1,273,134.48	1,282,446.48
1958-1959.....	5	70	17,660.50	607	29,291	1,694,289.44	1,711,949.94
1959-1960.....	4	89	15,376.50	635	43,711	1,884,719.91	1,900,096.41

QUEBEC, the 8th of March 1961.
UJ/AM.

Other Works

It will be noticed that in item 4 of the 1960-61 drainage budget, copy of which is attached, an expenditure of \$30,000 is ascribed to sundry expenses. Part of this sum was taken up by subsidies accorded by the Department to railway companies for the construction of restoration of bridges involved in the improvement of watercourses. An agreement was reached with these companies in 1944 and, since then, 75 cases have been settled, for which the Department paid subsidies amounting to \$69,500.96.

As the need for adequate drainage becomes less urgent—there is still plenty to be done—more assistance will likely be given to irrigation. This is believed to be necessary to counteract somewhat the adverse climatic conditions in the upper St. Lawrence Valley.

The CHAIRMAN: Thank you, Dr. Mercier. Are there any questions?

Senator SMITH (*Kamloops*): Mr. Chairman, is the second presentation to be integrated with the first?

The CHAIRMAN: Would you rather have the two go together?

Senator SMITH (*Kamloops*): I was thinking that would be advisable if they are closely related.

The CHAIRMAN: Yes, Professor Banting, would you come forward and give us a short background?

Prof. ANGUS BANTING, Professor and Chairman, Department of Agricultural Engineering, Macdonald College of McGill University: Mr. Chairman and honourable senators, I was born, raised and educated in Ontario. In 1937, after teaching school for a short time in this province, I moved to Nova Scotia with the Department of Agriculture when your colleague, the Honourable John A. McDonald, was Minister of Agriculture of that province. I had the privilege of working under him for about ten years during which time I was chairman of the Department of Agriculture Engineering which I organized at his request.

In 1951, I moved from Nova Scotia to Macdonald College to succeed Prof. Heimpel, retiring head of the Department of Agricultural Engineering at Macdonald College. I have been associated with that department ever since. I do not know that there are any other items of interest.

Senator STAMBAUGH: Where is Macdonald College?

Prof. BANTING: It is part of McGill University and is located near the western end of the Island of Montreal, about 20 miles from the City of Montreal.

Senator STAMBAUGH: We all know about McGill University.

Prof. BANTING: Macdonald college has been in operation for a little over 50 years and has established for itself a high reputation all over the world in the field of agriculture. It might be of interest to know that in the Faculty of Agriculture our student body approximates 230.

Senator STAMBAUGH: Macdonald College is entirely an agricultural college then?

Prof. BANTING: No, I must correct a wrong impression. Macdonald College is part of McGill University and it houses the Faculty of Agriculture, of which there are some 230 students; the Faculty of Household Science, of which there are about 100 students, and the Institute of Education, of which there are about 700. The subdivision of the student body in agriculture is made up of about one-third from Quebec province, one-third from the rest of Canada and one-third from the world in general. It is a cosmopolitan group and it has the

highest percentage of post-graduate students of any institute in Canada of its size.

Honourable senators, with that information I would like to embark on the reading of my brief. Is it permissible, Mr. Chairman, to interject comments as I proceed?

The CHAIRMAN: Quite right.

Prof. BANTING: This brief was prepared after some consultation with Dr. Mercier. In places it may appear that our consultation was not as good as it should have been. Perhaps we can pick these parts out as we go along and offer some explanation.

I have laid a foundation here for the reasons for drainage which may sound elementary in the first instance but I think are rather important.

Importance of Water

Water forms a very important part of all life. During their growth, agricultural crops extract the water they require from the soil. The quantities of water required by plants during the growing period vary considerably. It has been shown (1) that oats requires 541 pounds of water per pound of dry matter, clover 344, potatoes 749 and alfalfa 970. Translated to terms of depth of water, clover would require 9 inches for a 3-ton per acre crop, alfalfa 25 inches for 3 tons per acre, and oats in the neighborhood of 20 inches for 70-bushel crop. Moreover, this does not represent any moisture loss through evaporation from the ground surface or lost through the growth of weeds.

Water Storage

The soil forms the natural reservoir for the storage of moisture. However, the proportion of the rainfall that is stored may be quite small since it is dependent on a number of variables such as the slope of the ground surface, the absorptive capacity of the soil, the amount of vegetation on the surface and the amount of moisture already in the soil. Hence it should be obvious that practically none of the water falling as rain on a saturated soil (i.e., full reservoir) will be absorbed, while a high proportion of the water falling as rain on a dry soil may be absorbed for storage, if the conditions for absorption are favourable.

Associations of Water in Soil

The association of water with soil particles and its effect on crop growth is well documented. As a biological classification it has been suggested (2) that soil water may be divided into three groups; first, that which is unavailable, second, desirably available, and third, superfluous. The unavailable water is the water which the plant rootlets cannot absorb because of its close association with the soil particle. When a soil has only this unavailable water in it, it is said to be at or below the wilting coefficient. In other words, a crop growing on the soil where the water is reduced to this level would wilt for lack of moisture. The desirably available water is water in the capillary association with the soil particle which the plant rootlets can readily absorb. When a soil has as much available water as it can hold it is said to be at field capacity.

This is the important association. It is the water in this association in the depth of the soil in which the roots feed—i.e. the "Feeder-root Zone"—that provides for crop growth. The 9" to 25" of water required for a crop, as mentioned in the opening statement, must be in this association, in the feeder-root zone. It is in this zone that our interest is centred.

The capacity of a soil to hold water in the available association varies with structure, texture, and organic matter content. As a general statement it is considered that the following table holds (3):

Soil Type	Amount of moisture at field capacity inches per foot	Amount at wilting point inches per foot	Available moisture inches per foot
Light sandy	1.25	.25	1.00
Medium	2.25	.56	1.69
Heavy	3.67	1.26	2.39

Taking the three crops mentioned in the opening statement, clover feeding in 2 to 3 feet of medium soil would have available slightly over 5 inches of water. Alfalfa, feeding to 4 feet would have about 6½ inches, and oats feeding to a depth of 2 feet would have about 3½ inches. Supposing the growing season starts with the soil at field capacity, none of the crops could grow to maturity and produce the quantities stated without additional water being added during the growing season.

Superfluous water is water which occupies all of the spaces or voids in the soil between the soil particles thereby excluding soil air. In this state the plant will not grow because of the lack of oxygen supply to the roots. Hence this water must be removed before growth can proceed. In a normal growing season all three conditions may occur from time to time and at differing depths. At any time there may be a dry layer at the surface, with moisture below the permanent wilting point; a layer at the desirably available level; and below this superfluous water. The level at which this superfluous water stands is called the "Water Table". So long as the water table is below the feeder root zone the superfluous water causes no trouble. At the start of the season it is common for the soil to be in a saturated condition and usually this condition must be relieved before seeding is done. For a considerable period in most growing seasons there is sufficient available water to support satisfactory crop growth. However, when the season is dry the water content may fall below the wilting point causing damage to the crop. At the other extreme, a very wet season can return the soil to the saturated condition and cause damage. Proper soil moisture control prevents this. If there is superfluous moisture it is removed and if the moisture drops to the unavailable level in the soil it must be replaced. Drainage accomplishes the first objective, irrigation the second.

Drainage involves the removal of excess moisture either from the surface of the soil so that it cannot create an excess within the soil or from within the soil itself. The former is called surface drainage, while the latter is under-drainage.

Much surface drainage takes place naturally. However, when uncontrolled it is often damaging through erosion, or at the other extreme through inadequate facilities it may be damaging because of flooding. This, of course, is a condition that has been most serious in Quebec. Underdrainage may be natural or artificial, the latter involving the installation of water channels of some kind within the soil itself. Tile drainage is the usual form of underdrainage.

Main Drainage Channels

In a program of soil moisture control the immediate objective of drainage is to remove the excess moisture from the soil at the farm level. However, control of this aspect at the farm level may be quite impossible because of lack of adequate drainage channels to take the water away. This facility is

often referred to as "vent". When the water cannot be drained away from a farmer's holding, nothing can be gained by improving surface or under-drainage facilities on the farm.

Provision for Irrigation

At the other extreme, when it becomes necessary to add water to the soil, unless the farmer has an adequate supply of water, he cannot hope to provide irrigation.

While it is not possible to store large quantities of water in the soil for use by growing crops in the dry season, Farm Ponds provide one practical method of farm storage which has proven to be quite satisfactory. There are a number of types of farm ponds and it is a very unusual farm where at least one type cannot be constructed and operated successfully (3).

In the above discussion we have tried to show that adequate moisture control at the farm level involves underdrainage, surface drainage, farm pond construction and irrigation and, further, a complete program requires that there be adequate vent from the farm for all the water that must be drained away.

Quebec Work

Applying all this discussion to the problems of Quebec, it must be stated an excellent job has been done by the province in providing for the drainage outlet. For the past twenty years or so—this should be 30 years according to Dr. Mercier's brief—there has been an active program of deepening and straightening of main drainage channels. Already the benefit to the farmers has been exceedingly high and this has been reflected in improved agricultural conditions in many areas where main drainage works have been undertaken. This program is worthy of continuance and expansion. Main drainage channels already improved must have continuous maintenance or the benefits will be lost. The program should be expanded into other areas where main drainage channels are somewhat inadequate. It is at the farm level that a constructive soil moisture control program needs to be established.

Present Soil Moisture Control in Quebec

It must be recognized that there is some underdrainage work being done. However, in terms of the need the effort is very small. In terms of comparison with the main drainage channel work it is also very small. In 1958, for example, the province had 4 underdrainage ditching machines operating, and they installed altogether some 80 miles of tile drains.

Here is one place it appears we are at variance. Dr. Mercier referred to six drainage machines presently used by the staff. My figures are taken from the 1958 report which shows somewhat less.

By comparison, there were over 50 large machines of various kinds used in main drainage channel improvement, and a total of nearly 900 miles of work was done. As a rough estimate, it is possible that the 80 miles of tile drainage brought improvement to perhaps 800 acres. Total acreage benefitted by the main drainage channel work—over 113,000. This figure was taken from the report of the Department for 1958. There is no active program supporting Farm Pond establishment or irrigation installation.

A Soil Moisture Control Program

There are three aspects of a desirable program. These are financial, educational and technical.

On the first of these, the financial, a few remarks are in order.

Investment in underdrainage should be considered as a capital investment. A properly installed system of underdrains should continue to function for 20 to 30 years or more (4). It is reasonable then that the cost of a good underdrainage system should be amortized over a period of 20 years.

Costs

Average costs of underdrainage vary widely depending on the type of soil in which the drains are placed, the location, which influences the cost of the tile, and the number of feet of tile that must be installed to drain one acre of soil. The range may be all the way from a low of \$60.00 to a high of \$150.00 per acre. However, an average cost is usually taken as about \$75.00 an acre (5). Costs of farm ponds and of irrigation systems also are quite variable. A recent survey in Ontario indicates that dug ponds are likely to cost in the neighborhood of \$450.00 (6). The same survey reveals that the range of investment per irrigated acre is from \$47.00 to \$950.00 (7), and there is some suggestion that the average touches on \$200.00. It can thus be seen that a farmer who wants to effect the satisfactory control of soil moisture through both drainage and irrigation on a field of, say, 10 acres is faced with a capital investment of around \$4,000.00.

Benefits of Drainage

The benefits to be derived from underdrainage are well documented. They are detailed at considerable length in any text on drainage and may be found in bulletins published in New Brunswick, Quebec and Ontario. It is interesting to note that two bulletins have been published in Quebec on this subject in French, and one in English (8). So far as returns on the investment are concerned, this depends so much on the cropping plans and the management of the farm that no published figures have been discovered. In his bulletin (9) Professor Heimpel states as follows, "Drainage pays big interest on the money invested by increasing the yield and improving the quality of our products." However, I have heard Professor Heimpel use the figure 20% on a number of occasions.

Returns from Irrigation

Returns to be realized from irrigation are equally difficult to predict. In the Ontario survey mentioned previously, (7) a "break-even" increase in yield per acre was worked out for various crops. Any excess of these yields would pay dividends on the investment over and above that calculated as a required one. Three of the figures given were for potatoes 17 bags per acre, grain 15 bushels per acre, and beef pasture 120 pounds per acre, and there should be little difficulty in realizing these productions in a dry year, although there might be some doubt in a year of ample precipitation.

Sources of Financial Assistance

It is possible that financial assistance to enable the farmer to take advantage of drainage and irrigation, which can be shown to be a paying proposition as above, will be available through the increased credit facilities provided by the Quebec Department of Agriculture. One thing, however, must be emphasized. Most farmers regard an investment of \$3,000 to \$4,000 in buildings, which of themselves will not yield a return on the investment, with much less hesitation than they regard the same investment in their soil which will make an adequate return.

I think this is the crux of the whole situation. I have heard my own students talk glibly of going home after they graduate and spending \$4,000 or \$5,000 to improve their farms, yet when it is suggested to them that they spend the same amount of money on underdraining their soil or providing some facility for irrigation it is rather surprising to find that they do not think of it in the same terms at all.

The CHAIRMAN: We have a saying in western Canada to the effect that if you go along the road and see a farm with a big barn you know that the man is the boss, but if you see a farm with a big house you know that the wife is the boss. It is the same idea.

Prof. BANTING: Farm machinery salesmen try to size up the situation when they visit a farm, and they talk to the wife and the husband, but on some occasions they only bother to talk to the husband.

Educational

This points up the need of an educational program. Demonstrations of Drainage Systems, Ponds and Irrigation would be important, but an active program should use all the means presently available to the Extension man. This would be the first and most important part of a program on farm moisture control.

Technical

There is finally the question of technical assistance. The importance of this assistance cannot be overestimated. A farmer may have sufficient skill in planning and construction to design and build his own buildings. If slight or even important mistakes are made, it is generally possible to correct them without too great an expense. However, very few farmers have the knowledge and skill to design a proper drainage system, a proper farm pond, or an irrigation system. Particularly in the case of underdrainage, any errors made in the original system are slow and difficult to detect and extremely costly when it comes to correction. Practical assistance in the design of moisture control facilities should be provided by a corps of trained agricultural engineers. We feel it is more important that they be professional agriculturalists than that they be professional engineers. The argument is simply that the professional agriculturalist, who has engineering training, will be more aware of the problems in agriculture and the needs of the farmer than the professional engineer, even supposing the latter has an agricultural background.

It may be felt that the technical assistance could be provided by Extension personnel in the pay of drainage contractors and irrigation firms. However, these men must have the interests of their employers uppermost, and these interests will not always coincide with the interests of the farmer. Consequently, we feel that the technical assistance should be available from another source, preferably the provincial government.

If I might digress for a moment I would like to say at this point that I inserted this particular paragraph because irrigation firms do have very active Extension people on the road. They have not penetrated deeply into Quebec as yet, but they are very active in Ontario and, of course, in the western provinces. It must be recognized that when they are out to sell irrigation systems they think not so much of the farmer as they do of the firm they represent. This is not always a bad thing, but I do think there should be technical assistance available to the farmers besides that which is available through the Extension men from the irrigation firms, or the drainage contractors.

It is entirely possible that a corps of agricultural engineers in the Extension Department of the province could provide the necessary technical assist-

ance in moisture control works and, in addition, provide assistance in a broad range of agricultural engineering works outside of moisture control, but this aspect is beyond the province of the present discussion.

Costs of a Corps of Agricultural Engineers

We have suggested that there be a corps of Agricultural Engineers under the Extension Department who could carry on a program of Soil Moisture Control at the farm level. It would be reasonable that a corps of five or six men could provide a start on such program, but the staff would likely need to be increased considerably as the program got under way. Cost to the province might well be as follows:

Salaries	30,000 per year
Office space and help	20,000 per year
Travel	10,000 per year
Total	60,000

These figures may or may not have any validity. In addition, a capital investment of around \$1,000 for each man would be required for surveying instruments, cameras, *et cetera*.

May I digress again? Dr. Mercier in his brief has already stated that there is a group of people associated directly with under-drainage work. My brief suggests that we need at least six men to form a core of men who will do the extension work in trying to sell under-drainage and persuade the farmers, to use the example mentioned a few moments ago, that it is very worthwhile to spend \$4,000 on improving their land, and much more worthwhile in many cases than the spending of the same amount on improving their buildings.

Senator STAMBAUGH: You are talking about what would be necessary in the province of Quebec?

Prof. BANTING: That is right.

Out of the three aspects discussed above, the educational aspect is the first one that should be promoted. It could well be that this also could be the responsibility of a corps of agricultural engineers who would then be in a position to provide the technical help required to follow up the educational program.

The cost of this program to the province would be fairly small in comparison with the costs of the present drainage programs designed to take care of main drainage channels, but until an adequate program of soil moisture control at the farm level is instituted and developed, the province cannot hope to reap the full benefit of the present program of construction and maintenance of main drainage works. This is only a foundation on which moisture control at the farm level can be built. It would be most unfortunate if, with this strong foundation, an adequate structure for moisture control at the farm level is not carried through. The returns to the province in terms of increased production and improved quality of product would be very great indeed.

References

- (1) "Land Drainage and Reclamation"; Ayers and Scoates; McGraw Hill Co; Edition 1, Page 107.
- (2) "The Nature and Properties of Soils", Lyon, Buckman and Brady; MacMillan; 5th Edition; Article 7.20, page 215.

(3) "Sprinkler Irrigation Handbook"; Rainbird; Adapted from table on page 5.

(4) "Soil and Water Conservation Engineering"; Frevert, Schwab, Edminster and Barnes; Wiley; Page 218, chapter 12.

(5) "Keep your Tile Drains Working"; U.S.D.A.; Leaflet 347; 1954.

(6) "Tile Drainage"; Bulletin 501; Ontario Department of Agriculture; Page 11, and examples on page 10, plus general increases in costs of all types of construction justifies this figure; Also, the figure is used frequently in cost estimates in Ontario.

(7) "Dollars and Cents in Ontario Irrigation"; Circular 322; Ontario Dept. of Agriculture; page 3.

(8) Ditto; page 2.

(9) "Le Drainage Pratique"; Michaud; Quebec Department of Agriculture Bulletin No. 2; 1913.

"Tile Drainage of Farm Lands"; Heimpel; Quebec Department of Agriculture Bulletin 89; 1925.

"Le Drainage Souterrain"; Jean; Quebec Department of Agriculture Bulletin No. 105; 1944.

(10) "Tile Drainage of Farm Lands"; Heimpel; Quebec Department of Agriculture Bulletin 89; Page 13.

The CHAIRMAN: Thank you very much, Professor Banting.

Senator GOLDING: You spoke about the province having these machines and equipment for ditching and that sort of thing. Are there not private individuals who buy them and do the work for the farmers?

Prof. BANTING: Yes, there are drainage contractors, and I think Dr. Mercier will support me when I say that drainage contractors have been quite active in Pontiac county, and I think there are some down towards the St. Lawrence, are there not?

Dr. MERCIER: Private enterprise is not always interested in purchasing the big machines because when there is no under-drainage going on the machines are idle, and they are costly to operate.

I mentioned that we have now six of these machines, and we might buy additional ones. I am not too sure as to whether or not we should endeavour to attract private enterprise to this type of work as we do in connection with the construction of large water courses, but it is one possibility. They would be more interested in coming into this business if they had the assurance that their machines would be fully employed during the whole drainage season.

The CHAIRMAN: Have you experienced any problem in going across any particular farm? Suppose there is a farm on the west, a farm in the centre and a farm in the east, and you wanted to take that drainage system right through. Have you had any trouble with the farmer in the centre who might not want to have the drainage go through his farm?

Dr. MERCIER: Sometimes; on occasion that land can be expropriated, but it is not easy. Up to the present we have tried to make the farmers realize that if they want drainage then they have to co-operate, and on the whole we have been successful. They must co-operate with their neighbours.

Senator SMITH (Kamloops): I take it that this is a strictly provincial program without any federal participation or assistance?

Dr. MERCIER: That is correct. The thinking here, of course, is that soil is a natural resource and it belongs to the province, so that the province might as well foot the bill. That is the attitude taken by Quebec up to now, and I doubt that it will change.

Senator SMITH (Kamloops): The reason I ask that is because we are naturally interested in land use from a national standpoint. We have heard

a lot about the activities of P.F.R.A. in western Canada, and the Maritimes Marshland Rehabilitation Administration in the east, and it would seem to me that many of the engineering problems that we have heard of this morning, and the administrative problems and many other factors, are common to those met with by P.F.R.A. in the west and M.M.R.A. in the east. Is there some common factor in these organizations that would be of interest in a study or survey of a national policy with respect to this matter?

Dr. MERCIER: There is no equivalent of the Prairie Farm Rehabilitation Administration in the east, as you all know. Whether this improvement of rural land and this rural development program is likely to grow and become an equivalent of the Prairie Farm Rehabilitation Administration we do not know, but in the matter of drainage there was an urgent need and as there was no national policy, or no policy corresponding to that of the Prairie Farm Rehabilitation Administration in Quebec, the province had to go on on its own. There are possibilities, I think, of the two Governments co-operating in a kind of a joint policy, and in Quebec we are looking with a great deal of interest towards this new pact that is going to come in to restore the rural areas.

Senator TURGEON: What you suggest is exactly the same as that which took place years ago in regard to the rehabilitation of marshlands in the Maritime Provinces. I happened to be chairman of a committee on reconstruction that made the suggestion, and it was mentioned that P.F.R.A. was left out of any succeeding legislation, but, as a matter of fact, the federal Government and the provincial Governments concerned shared the cost of carrying out a policy that was exactly the same as that of the P.F.R.A. but applied to the position of the marshlands at that time. It worked then. I am not sure at the moment, but I think the federal Government bore 50 per cent of the cost.

Dr. MERCIER: Maybe drainage within a given province is not considered to be part of a national program like that reclamation of land in the Maritimes might have been. There is a possibility for good co-operation in the rehabilitation of the rural areas.

Senator STAMBAUGH: Mr. Chairman, generally speaking I think there is a vast difference in Quebec. For instance, they, generally, have too much rain whereas in the west we have too little. Quebec's problem is one more of drainage, whereas ours is one of irrigation.

Dr. MERCIER: In most areas of the upper St. Lawrence and the Eastern Townships, we get anywhere from 40 to 50 inches of rain per year. That is quite a lot of rain, and a big portion of it comes, of course, from the snow. The average snowfall is about 100 inches, and it melts out quite rapidly in the spring, so we have to have proper outlets so that the water can go to the St. Lawrence River. That is why drainage is so important.

Senator STAMBAUGH: But your soil is generally soaked in the spring?

Dr. MERCIER: Oh, definitely, for a long period of time.

Senator BARBOUR: Professor Banting, in your brief you say, "It can thus be seen that a farmer who wants to effect the satisfactory control of soil moisture through both drainage and irrigation on a field of, say, ten acres, is faced with a capital investment of around \$4,000."

What could you grow to make any percentage of a profit in any province where you might spend \$4,000 on ten acres of that land? I was talking to a farmer from Rosetown the other day who grows a great deal of wheat, as much as 40,000 bushels in one year. He said the soil there is ten feet deep and fertilizer is no good to them and they just don't use it. The average yield over the years has been at least 25 bushels to the acre in that section. I would like to know what you could do with this land at a cost of \$4,000 per ten acres?

Prof. BANTING: This \$4,000 for ten acres would have to be considered as being amortized over a long period of time. That means that the actual returns you would have to meet annually over a period of perhaps 20 years would not be so large. This can actually be realized in quite a number of crops with proper drainage and irrigation; for example, on potato land, pasture land, and perhaps to a less extent even on grain land. It can all be shown to be profitable.

Senator STAMBAUGH: At 5 per cent you would have to get a yield of \$20 an acre to pay the cost of the improvement.

Prof. BANTING: Yes.

Senator STAMBAUGH: That is quite a yield per acre to start out with, and then there is the cost of the land in the first place.

The CHAIRMAN: This type of land will produce three tons of alfalfa an acre in a year, isn't that right?

Prof. BANTING: Yes.

The CHAIRMAN: And the value of alfalfa would be roughly what?

Prof. BANTING: I am not competent to give quotations.

The CHAIRMAN: \$20 a ton?

Prof. BANTING: I imagine so.

Senator GOLDING: Are you talking now about irrigated land?

Prof. BANTING: I am talking about land which has to be drained first, in many cases, and then have facilities for irrigation put in.

Senator GOLDING: If the land is properly drained it would last a lifetime, as far as that goes.

Prof. BANTING: Oh, yes.

Senator GOLDING: What I was thinking was that if you had an irrigation scheme you would have an annual cost in connection with it.

The CHAIRMAN: That is a little different.

Senator GOLDING: I think the picture should be made clear. If it is simply a drainage system, then it would last for a lifetime if the drainage was properly done.

Prof. BANTING: Correct.

Senator STAMBAUGH: Why do you say 20 years, then?

Prof. BANTING: Because you cannot get any authority to state a life. The best authority I could get was a leaflet published in the United States saying that systems should last for a period of 20 years. The difficulty comes from a fact that in many instances, maintenance of the outlets is not properly carried on and when an outlet of a drainage system fails the whole system is likely to be interfered with. Twenty years is probably a fair average life but, as you say, if the drainage system is properly cared for it will last a lifetime.

Senator GOLDING: Yes.

Prof. BANTING: The question of what a farmer can grow in order to realize a return on a \$4,000 investment is a rather important one. I think it is safe to say that on all types of specialized crops it is possible to realize adequate returns for drainage and irrigation. That would include orchards, truck farming areas, and highly intensified pasture land for beef production, and quite a number of different types of crops. If a person is going to be satisfied with growing a medium production crop of grain, I certainly would not recommend irrigation. I am not sure I would even recommend drainage. But there are probably some areas on every farm that could well benefit by an irrigation or drainage system, certainly irrigation in dry areas.

It is true that Quebec has a rainfall of from 40 to 50 inches per annum but this rainfall is not well distributed and it is a fact that an area south of the St. Lawrence River around Howick and Ormstown this past year was without a drop of rain for over two months, and this came right in the crucial part of the growing season. As a result of this condition the crop was not up to what it should have been. Had they had irrigation it is entirely possible that the increased yields would have played a substantial part in the cost picture.

Senator STAMBAUGH: Your irrigation scheme would involve a pumping machine, would it?

Prof. BANTING: An overhead sprinkler system, yes. That is what the figures in this brief are based on. The Ontario report I referred to dealt with irrigation system in three areas, the Bay of Quinte—small fruits—the tobacco area in Norfolk, and the intensified areas around Windsor.

Senator STAMBAUGH: They would have to be intensified crops.

Prof. BANTING: These mostly are in intensified crop areas.

Senator BARBOUR: I don't think you could do it for potato crops. In northern Ontario they grow four to five hundred bushels of potatoes to the acre without any of these systems, and in the Maritimes they produce three to four hundred bushels to the acre. You might do it with respect to intensified crops but not potatoes.

Prof. BANTING: So far as potatoes are concerned, quite a number of farmers are growing them on properly drained land. As a matter of fact, in some potato areas in New Brunswick and Quebec pretty nearly half have had to be drained before they have become productive as potato land. I know of one student who comes from the Gaspé area. He said only yesterday he has about 60 acres of potato land and they use it intensively and they have under-drainage. In addition, honourable senators, there are potato growers who sometimes have to use irrigation because of the inadequate supply of moisture by natural means. In these cases it has been regarded as a crop insurance scheme, and a rather valuable one too. But the trend in irrigation today is towards regarding it as a general practice and not just to have it there when you could put the water on in case the rainfall was not adequate.

Senator GOLDING: The cost of draining the land in the counties of Essex East and Kent is relatively high. They put drains in about four rods apart. When that is done across a field it becomes pretty costly, but they do produce tremendous crops there. In my day on the farm you never saw these ditching machines. The farmer did it by hand and he didn't have any engineer to tell him where to put his ditches. He saw that for himself.

Prof. BANTING: That is right.

The CHAIRMAN: How many acres need draining in the province of Quebec and how many acres are presently being drained?

Dr. MERCIER: I do not have the precise figures and although I would like to check more thoroughly before placing them on record, I would venture to say that we have over a million acres under drainage.

Prof. BANTING: I shouldn't be surprised.

Dr. MERCIER: We need to extend that by from 10 to 20 times. May I add, to answer the question of Senator Barbour, that even with the growing of oats we figure under-drainage is profitable. For example, at the Experimental Farm at Lennoxville we estimated we got an increased yield of about five bushels per acre over the other land. Over a period of 20 years that yields a fair margin.

Senator BARBOUR: What is the yield per acre?

Dr. MERCIER: We went up to 110, but the average is 75 for the Farm over the last three years.

The CHAIRMAN: What is the average size of farms there?

Dr. MERCIER: Eight hundred acres.

The CHAIRMAN: All privately owned?

Dr. MERCIER: No, I am speaking of the Experimental Farm.

The CHAIRMAN: What about individual farms?

Dr. MERCIER: The average is about 130 acres but they are not all drained. In the sugarbeet producing areas around St. Hyacinth the farmers there will tell you that any drainage system will produce a better yield in a two or three-year period.

Senator STAMBAUGH: Sugarbeets are one of the best paying crops for irrigated land in the West.

Dr. MERCIER: It is not only the sugarbeets but also the fact there is a good crop of barley afterwards, and alfalfa. It is the surplus of the crop.

Senator STAMBAUGH: I notice a slight discrepancy here. You say five bushels per acre and Professor Banting says fifteen.

Dr. MERCIER: I was referring to the Experimental Farm itself at Lennoxville.

Senator BARBOUR: Are you guaranteed a good crop every year?

Dr. MERCIER: Well, we have good moisture in Lennoxville.

Prof. BANTING: The 15 bushels per acres referred to represents an increase in yield as a result of irrigation. You would have to get that before irrigation would pay extra dividends on its cost.

Senator STAMBAUGH: That was not drainage?

Prof. BANTING: Not strictly. Drainage is implied in this as a first prerequisite. There is one other comment I would like to make, supporting what Dr. Mercier has said. I think you will find in the general reports of the experimental farm system they have shown pretty conclusively—and we use this as a comparison—that for each day's delay beyond the earliest possible seeding date for oats you stand to lose one bushel in the yield per acre. For example, if you could sow on April 1st and you do not sow until April 7th, your yield will be seven bushels less over the whole period. Underdrainage has a lot to do with that. May I be permitted another comment?

The CHAIRMAN: Certainly.

Prof. BANTING: A lot of the remarks that have been made this morning in connection with the possibility of realizing larger returns on drainage and irrigation have had the present day in mind. We are today facing a period of heavy expansion, a population explosion, if you like, and we are going to need every bit of land available for the growing of food. It has been suggested that by the turn of the century we are going to be facing periods of food shortage, not only in the world in general but perhaps in Canada. If we are prepared to embark on programs of this kind which will help to improve our production both in quantity and quality then we will be setting ourselves up so that we can properly meet these challenges when they come. I think we have got to look forward as well as look to the kind of return we would like to see at the present time.

Senator GOLDING: You were speaking about getting the crop in early. Here is a picture of a farmer in Middlesex county who sowed 12 acres of oats on February 27 of this year.

Prof. BANTING: I hope his land is well drained, because if it is not he will just lose those oats.

The CHAIRMAN: Are there any other questions, honourable senators?

Senator STAMBAUGH: I would like to move a vote of thanks to Dr. Mercier and to Professor Banting for coming here this morning.

The CHAIRMAN: Yes. Thank you very much, Dr. Mercier and Professor Banting. We have listened to two very good briefs.

The committee adjourned.

JAN 2 - 1900



Fourth Session—Twenty-fourth Parliament
1960-61

THE SENATE OF CANADA

PROCEEDINGS OF

THE SPECIAL COMMITTEE OF THE SENATE

LAND USE IN CANADA

No. 7

WEDNESDAY, MARCH 22, 1961

The Honourable Arthur M. Pearson, Chairman
The Honourable Henri C. Bois, Deputy Chairman

WITNESSES:

CANADA DEPARTMENT OF AGRICULTURE

Dr. W. J. Staple, Research Branch, and Mr. S. F. Shields, Regional
Director, P.F.R.A.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Higgins	Power
Basha	Horner	Smith (<i>Kamloops</i>)
Bois	Inman	Stambaugh
Boucher	Leger	Taylor (<i>Norfolk</i>)
Bradette	Leonard	Taylor (<i>Westmorland</i>)
Buchanan	MacDonald	Turgeon
Cameron	McDonald	Vaillancourt
Crerar	McGrand	Wall
Emerson	Méthot	White—31.
Gladstone	Molson	
Golding	Pearson	

(Quorum 5)

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

"The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Blois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—

Resolved in the affirmative."

J. F. MacNEILL,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

WEDNESDAY, March 22nd, 1961.

Pursuant to adjournment and notice the Special Committee of the Senate on Land Use in Canada met this day at 8.00 p.m.

Present: The Honourable Senators: Pearson, *Chairman*; Basha, Cameron, Higgins, Inman, MacDonald, McGrand, Smith (*Kamloops*), Stambaugh, Taylor (*Westmorland*) and Vaillancourt.

In attendance: Mr. Ralph A. Stutt, Special Consultant to the Committee, and the Official Reporters of the Senate.

Dr. W. J. Staple, Research Branch, Canada Department of Agriculture and Mr. S. F. Shields, Regional Director, Prairie Farm Rehabilitation Act, Canada Department of Agriculture, presented briefs and were heard and questioned.

At 10.00 p.m. the Committee adjourned to the call of the Chairman.

Attest.

James D. MacDonald,
Clerk of the Committee.

THE SENATE

SPECIAL COMMITTEE ON LAND USE IN CANADA

EVIDENCE

Ottawa, WEDNESDAY, MARCH 22, 1961

The Special Committee on Land Use in Canada met this day at 8 p.m.

Senator ARTHUR M. PEARSON in the Chair.

The CHAIRMAN: Honourable senators, we have with us this evening Dr. W. J. Staple from the Research Branch, Canada Department of Agriculture, at Ottawa; and Mr. S. F. Shields, Regional Director of P.F.R.A., of Swift Current, Saskatchewan. I would first ask Dr. Staple to give us some of his background, and then to present his brief.

Dr. W. J. STAPLE (*Research Branch, Canadian Department of Agriculture*): Mr. Chairman and honourable senators, I came originally from Sceptre, Saskatchewan, which is north-west of Swift Current, in the southern part of Saskatchewan. I took my early training at the University of Saskatchewan and later at the University of Toronto.

For some 20 years I was engaged in soil moisture research, at the Soil Research Laboratory at Swift Current, which was in the centre of the drought area. About a year and a half ago I was transferred to the Soil Research Institute at the Research Branch at the Experimental Farm here in Ottawa.

The CHAIRMAN: Thank you. That will be sufficient. Please read your brief and there will be a short question period afterwards.

Dr. STAPLE: Mr. Chairman and honourable senators, my remarks on water conservation in the Prairies are based on over twenty years' experience in soil moisture research at Swift Current, Saskatchewan. Results obtained at Swift Current are applicable to a considerable degree to all wheat-growing areas of the West.

As applied to dryland agriculture, water conservation means the storage in the soil of water from rainfall and snowfall and its subsequent use by crops. Storage of moisture is dependent on many factors, most of which are associated with soil and weather and which are beyond the control of the farmer. These factors must be assessed, however, if one is to learn when and under what conditions conservation practices are worthwhile.

Immediately rain strikes the soil it is distributed in different ways; some is lost through runoff, some evaporates and returns to the atmosphere. Of the water that enters the soil some is stored for future use by crops or is lost due to weed growth. In periods of heavy rainfall some water passes through the root zone of cereal crops and is lost by deep percolation. The amount of precipitation and the subsequent loss by the different processes varies from year to year and even from season to season.

The following table shows the mean precipitation and moisture conserved in southwestern Saskatchewan for different parts of the 21-month summerfallow period.

The CHAIRMAN: Could you explain a summerfallow period to some of the eastern members of the committee who may not know what it means?

Dr. STAPLE: That will be given later in my brief, when I enlarge on the table.

Senator HIGGINS: What is a 21-month summerfallow?

Dr. STAPLE: It starts from the time you take the crop off in August, extends through that winter, throughout the following summer and the following winter. The total period adds up to 21 months. In other words, a crop is grown from May to July, and then there are 21 months in which no crop is grown.

Senator HIGGINS: Do you count snow in that?

Dr. STAPLE: Yes.

Senator HIGGINS: What do you allow, 10 inches of snow to one inch of rain?

Dr. STAPLE: Yes, that is the rule that is used.

Moisture conserved in Saskatchewan soils during different parts of the 21-month summerfallow period.

(7-year average 7 locations)

	Stubble		Fallow		
	Aug. to Oct.	Nov. to April	May to Oct.	Nov. to April	21-month total
Mean precipitation (inch)	2.2	4.3	7.8	4.4	18.7
Mean conservation (inch)	0.8	1.4	1.0	0.7	4.0
Cons/prec (per cent)	36	33	13	16	21

Only by obtaining data such as these does one realize how low the water conservation is in certain periods of the year and conversely how large are the losses. As most of you know wheat is grown on the prairies in a 2- or 3-year rotation with fallow every second or third year. The fallow year represented in the table commences after harvest, the first period being from harvest to freeze-up when the fields are in stubble. The second period is over-winter, November to April, with fields still in stubble. The third period is May to October when the fields are cultivated and the fourth period is over-winter when the fields are bare. The mean annual precipitation in southwestern Saskatchewan during the years of these measurements was 13.5 inches.

The table shows that about 33 per cent of the precipitation was conserved when the fields were in stubble but that only about 15 per cent was conserved when fields were in bare fallow. In terms of water conserved, a little over half of the conservation for the whole summerfallow period occurred, on the average, during the first fall and winter—that is, 2.2 inches were conserved out of a total of 4.0 inches. This means that if you were seeding stubble you would have 2.2 inches of water available and if you were seeding fallow you would have 4.0 inches.

Just to give you some idea of what that means in terms of crop yield we estimate a yield of 4 bushels per acre for each extra inch of water conserved, so that, on the average, you would have 8 bushels per acre more yield on fallow than you would have on stubble.

The total moisture stored for the 21-month period was 21 per cent of the combined precipitation. It would be emphasized that these are averages and that the variability was high. For instance, the conservation in stubble at seedtime varied in a 7-year period from 0.5 inch to 3 inches—an average of 2.2 inches. The conservation in fallow at seedtime for the same period varied from 2.7 to 5.1 inches, although the average was 4 inches. High variability in precipitation and moisture conservation makes the term semi-arid applicable

to the drier regions of the prairies, and encourages the use of fallow with its assurance of some crop.

The success of summerfallow may be attributed partly to the remarkable response made by the wheat crop to small increases in stored moisture. The probability of a certain yield can be based on the moisture stored in the soil at seedtime. Frequently the decision on whether or not to seed stubble fields is based on the moisture condition. Soil texture should be taken into account also; crops grown on heavy clay will yield higher per inch of water used in a dry season than will those on loam and sandy loam.

One of the reasons why one gets such a good response on summerfallow is that the crop requires five to six inches of total water use before any grain is produced. This water is used during early vegetative growth. The average precipitation during the growing season is about six inches, and that is added to the stored moisture to give the total that the crop uses. However, in a dry year, the seasonal precipitation may be less than the minimum for vegetative growth, so that if the storage is low, one can have almost a failure on the stubble, and yet a fair crop on the fallow. Furthermore, with higher storage in better years, the increase in yield is sometimes greater than the four bushels per inch which I mentioned.

The reason for the differences in efficiency of moisture conservation at different periods of the year are fairly obvious. After harvest the soil in stubble is dry and evaporation is low so that unless weed growth is excessive the chances of conserving moisture are good. Likewise stubble fields hold snow over-winter, sometimes making appreciable gains in moisture because of snow drifting from adjacent fallow fields. The soil is usually relatively dry and open so that the spring runoff is not as severe for a given snow coverage as in fallow. I am referring here to the first winter in stubble land.

The loss that does occur may be fairly evenly divided between evaporation and runoff. In the summer when the fields are relatively bare the losses at Swift Current are largely from evaporation and weed growth. Runoff occurs in some years but is not severe over much of the prairies. In the second winter the losses due to drifting snow, runoff and even evaporation may be high because the surface is unprotected, and deep frost often makes the sub-soil impermeable to water.

Time does not permit discussion of the physical processes of moisture conservation in more detail. Representative data have been presented merely to show the magnitude of water conservation under farm conditions and to form a background for the remainder of my remarks. Further information is available in technical publications. Mr. Lehane and I have collaborated on a number of papers on the conservation and use of moisture on the prairies. A paper which I prepared on the significance of summerfallow in semi-arid regions was published by UNESCO recently. A farmer's bulletin on the influence of depth of moist soil at seeding time was published this spring by the staff of the Experimental Farm at Swift Current. Earlier this month I presented a paper at a National Research Council symposium in Toronto on the influence of shelterbelts on evaporation. The experiment stations and colleges in the Northern Great Plains region of the United States have also published many papers which are applicable to the Canadian West.

The various losses in water conservation might be considered now in relation to current farming methods. The greatest loss in much of the prairies is, of course, evaporation from both bare and cropped surfaces. Many authors have pointed out that if an extra inch of water could be conserved per year much of the hazard of grain growing would be eliminated. Experimental work has shown, however, that moisture conservation is dependent largely on the amount and distribution of the rainfall. The ability of the farm to alter the moisture storage by tillage is limited. It has been shown repeatedly that the

main benefit of cultivation is weed control. Excessive cultivation of fallow should be discouraged. The dust mulch has been discredited although there are periods after rains or after spring flooding that a loosening of the surface reduces the evaporation rate, at least temporarily. That is, the principles are there, and it is a matter of deciding when they fit and when they do not fit. We know that in the heat of the summer on the Prairies that method does not conserve moisture, whereas if we had a high water table, it would. We have to consider where these things work, and where they do not.

There is some evidence to indicate, too, that light tillage early in the spring is beneficial in holding moisture in the seed-bed. The maintenance of trash covers reduces evaporation to some extent; estimates made at Swift Current indicated that the reduction during the fallow period was often negligible and that it would rarely exceed 0.5 inch.

The movement of moisture through soil is a complicated subject and much more research is needed. However, since the main controlling factors are natural phenomena rather than man, small gains only can be expected through soil management. I do not anticipate a major "break through" in research in this field as some have visualized. Small gains in water conservation are important nevertheless, and timely tillage sometimes makes the difference between a good crop and a poor one.

The next important loss of water is from runoff. In southern Saskatchewan, and probably in most of the prairies, the major runoff is in the spring when rapid thaws occur and the frozen soil is not in a condition to absorb large quantities of water. Variability in soil moisture due to spring runoff causes much of the unevenness observed in crop growth at harvest. In years of high snowfall and rapid spring thaw the depth of moisture penetration in stubble may vary in a small area—that is, from one small spot in a field to another—from 24 inches to beyond the normal root depth of 48 inches. If the soil is not wetted below the root zone a certain amount of runoff may not constitute a net loss as the water may be merely redistributed from one part of a field to another. Thus far, terraces or contour farming have not been used to any extent in western Canada.

The general assesment is that terraces are expensive and they would only be recommended under unusual circumstances. Contour farming, on the other hand, is a recommended practice and should be used wherever it seems worth while. There is no doubt as to its benefit, particularly on sloping land and on land that is relatively impermeable and where water must be slowed down to increase penetration.

Losses due to deep percolation occur only rarely in the drier portions of the Prairies. Until the 1950's it was assumed at Swift Current that some moisture was lost below the root zone (4 foot depth) in 3 years out of 10. Even when some loss occurred it was quite small on the average.

Starting in 1951, however, some loss occurred in 5 out of 6 consecutive years and some of this water was lost at seedtime in stubble prior to spring tillage. That is, after the first winter when, as I have stated, on the average we conserved only 2.2 inches we did have some water pass below the root zone. In other words, we had up to 5.5 to 6 inches in stubble land at seedtime in those wetter seasons.

Obviously in these years the fallow did not conserve additional moisture and greater production would have resulted from some form of continuous cropping.

In the more humid regions some water may be lost below the root zone almost every year. A loam soil will hold only 6.5 inches of water, on the average, in the upper 4 feet and if the conservation frequently exceeds this, the advantage of summerfallow for moisture conservation is unjustified. The same

conclusion is reached with even moderate rainfall on sandy soils. If a soil will not hold more than 4 or 5 inches of water—for example, sandy loam—summer-fallow may be ineffective. The trend in southern Saskatchewan has been to grow wheat and fall rye alternately on such soils eliminating the summer-fallow. Unfortunately, the law of diminishing returns operates to some extent in moisture storage in fallow, and as the maximum capacity of soil to hold water is approached, the probability of loss from evaporation and runoff as well as from subsoil drainage increases.

That is, it is a good thing if the soil can be moistened almost to capacity, but if this is overdone the fallow becomes less efficient.

One of the losses in water conservation which continues to be large and about which the farmer can do something is weed growth. Chemical sprays have alleviated the situation in the case of some weeds but others such as wild oats continue to be a major problem. In the more humid districts the practice of summerfallowing is justified more as a weed-control measure than for water conservation. The fact that seven or more tillage operations are considered necessary for fallowing in some of these districts increases the hazard of wind erosion. I am speaking here particularly of some of the areas in Manitoba and northeastern Saskatchewan.

Fall tillage of stubble land is not effective in conserving additional moisture in southern Saskatchewan. Some benefit might be obtained where fall growth of weeds produces appreciable losses. In any case, fall tillage with machines that flatten the stubble and reduce snow accumulation should be avoided. All weed growth in fallow represents some loss. Weeds should be kept down particularly in the spring of the fallow year, in order that water from June rains can be conserved with maximum efficiency.

Field shelterbelts reduce the wind speed to a distance of over twenty times the height of the tress. This sheltering reduces the hazard of soil drifting if the trees are established in a uniform pattern so that the fields are fully protected. Shelterbelts also increase moisture supply in the sheltered zone by trapping snow and reducing evaporation. The net gain in wheat yield, however, is small—of the order of one bushel per acre in strips 27 rods (440 feet) wide protected on each side by single rows of caragana 7 to 10 feet high.

Those are the standard shelterbelts and the standard pattern in southern Saskatchewan.

The current practice for wheat growing in much of the prairies is to use the 2-year rotation of wheat and fallow. Blade and cultivator-type implements are used when fallowing to maintain a stubble mulch. Summerfallowing has many disadvantages in that it increases soil erosion and losses of moisture are often high from evaporation, runoff and deep percolation. However, despite this inefficiency, no alternative to fallow is available in the drier areas if the farmer is to have some assurance of a crop.

In other words, if the farmer does not have enough rainfall in one season to grow a crop he must wait for two seasons. The situation should be re-examined closely, however, as methods of tillage and weed control improve.

The need of fallow in the more humid districts is questioned where lack of available nitrogen rather than moisture deficiency may depress yields. Fertilizer application can be used in place of fallow to offset lack of nitrate.

It may seem that I am condemning summerfallow. Actually, I am not. In this discussion I am merely pointing out that if water goes through the root zone and is lost, or if one is doing more tillage than is needed to control the weeds or, if, on the other hand, the fields are summerfallowed for moisture storage when actually the lack is of nitrogen, then some other management practice might be used to replace the summerfallow.

Senator McGRAND: Do weeds contribute to the storage of nitrogen in crops?

Dr. STAPLE: Not directly. Weeds, of course, use up moisture and nutrients, and if weeds are permitted to grow in summerfallow, then nitrate is not accumulated. In order to have nitrification the soil must be in a moist, warm condition. On the other hand, if one grows a lot of weeds or any type of vegetative matter, there would be some ultimate return of nitrogen but it would not be an economical way of doing it.

Senator HIGGINS: If water goes below the root zone of the crop, is it entirely lost?

Dr. STAPLE: Usually.

Senator HIGGINS: Does it create a dampness of some sort?

Dr. STAPLE: We have some examples where a crop may be rushed to maturity and leave moisture in the root zone. Following a very hot period in July the roots may not get down, and may not use all the moisture throughout the four- or five-foot depth. In that case, there may be some left, and in a subsequent year if sufficient rain falls to make contact with the moisture one might experience a lengthy growing season with good root development and the moisture left from the previous season might be used effectively. On the other hand, if the moisture is definitely below four or five feet it is usually lost and does not move up into the root zone.

Senator STAMBAUGH: What success has there been with some of these new chemical sprays on wild oats?

Dr. STAPLE: That is not in my field, sir. There is quite a lot of literature on it at the moment. Mr. Leggett of Regina and various others at Winnipeg, I believe, are having some success with it; but it is my understanding, that further work has to be done.

Senator STAMBAUGH: You have not had any experience yourself?

Dr. STAPLE: No.

Senator TAYLOR (*Westmorland*): You mention in the brief the work that is being done in Saskatchewan to prevent excessive evaporation of soil moisture. Is there continuous research in connection with the work of determining the amount of moisture in the soil from year to year, in that particular area of Saskatchewan?

Dr. STAPLE: Yes. The work originated by Mr. Barnes has been continued in various phases and is still being carried on. Detailed samples are taken at various substations throughout the southwest in order to get background information. Then substation operators check the depth of moist soil in the field to see how this correlates with crop yield.

Senator TAYLOR (*Westmorland*): Is this information made available to the farmers in the area?

Dr. STAPLE: Yes. As I mentioned, a report by the staff of the experimental station at Swift Current was published this year and gives some of the information you mention.

Senator TAYLOR (*Westmorland*): I have another question. I am an easterner and perhaps in my ignorance I have had the feeling that spraying would prevent a lot of this cultivation and loosening up of the soil. Is it a problem to keep the soil cultivated as we do in the east in order to conserve moisture?

Dr. STAPLE: It is a matter of keeping the weeds down and preventing them from transpiring moisture. Quite a bit of work has been done in western Canada and the drier regions of the United States to try to combine sprays with tillage. I believe it is agreed that one cannot use sprays alone, but must use tillage to keep the soil in good condition. They have been trying to use both. Thus far I do not believe it has been too successful, because it seems

that a few weeds are able to escape the spray treatment; but the work is being continued. Some long-term projects of this nature are being carried on at Experimental Farms in western Canada where they are co-ordinating their efforts and trying to get results applicable to different soils.

Senator MACDONALD (*Queens*): I recall some years ago, in the vicinity of Wilcox the windstorms turned the soil. Is the Saskatchewan department of agriculture interested in advising the farmers to sow grass seed in order to get some fibre into the soil so that if there is a bad windstorm the soil will hold because of the fibrous matter and not blow away? Has anything been done along that line? In the 'thirties they were hard hit in that area, and we in Prince Edward Island help them out by sending potatoes to keep them alive. What are they doing in the way of rotating crops?

Dr. STAPLE: In answer to that, may I say I was actually at the Swift Current farm during the years you are referring to; I was there for some 24 years. I believe both the federal and provincial governments are doing all they feel possible in the line you mention with reference to soil drifting control. In most cases, I believe that farmers on the better soils prevent severe soil drifting by using trash covers. Mr. Shields will be describing the re-grassing of pastures to prevent wind erosion on soils that are too coarse textured to be farmed by the usual methods. One of the difficulties I believe with the type of rotation to which you refer is that they had difficulty in dry years in establishing grasses in a short-term rotation. The stand was poor and weed growth took over the land. There, also, I believe a good deal of research has been done since the 'thirties, and I know the forage crop specialists have obtained encouraging results in establishing and maintaining grasses, and in the use of crops like alfalfa under dry conditions. In the more humid areas of the west one sees more soil-building rotations coming in and fitting in with livestock production.

Senator SMITH (*Kamloops*): Mr. Chairman, I would like to ask Dr. Staple a question in regard to the reference in the brief to shelterbelts. Did the small gain of, I think you said, a bushel to the acre, discourage the extension of that shelterbelt system that was promising enough to be pretty well established over quite an extensive area there?

Dr. STAPLE: It is one of those questions to which we cannot give a definite black or white answer. Those areas you refer to were put down on an experimental basis, and from the results we have obtained we would not hesitate to recommend them for wind erosion control on lighter soils where they grow well. I think the same conclusion has been reached in various parts of the United States, where the land is properly treed. Shelterbelts are quite a help also in preventing snow from blocking roadways, and in growing special crops. On the other hand, as you see, the increase in wheat yield has been small. We would not be justified in recommending an extensive program on that basis on soils where the farmers feel they can prevent erosion without additional protection.

Senator SMITH (*Kamloops*): In that experimental farm area west of Outlook it is extensive?

Dr. STAPLE: Yes that is the Conquest project.

Senator SMITH (*Kamloops*): Has that work been discontinued?

Dr. STAPLE: No, a certain amount of planting is continuing on the federal experimental projects. The Saskatchewan Government, and the Manitoba Government too, are assisting farmers planting field shelterbelts for special purposes, in many cases on coarse-textured soils.

Senator STAMBAUGH: Doesn't the caragana take a considerable bit of moisture through its extensive root system?

Dr. STAPLE: That is true, and as time goes on the roots extend farther into the fields. The root extension is one and one half to two times the tree height. A recent United States publication showed that tree roots in the southern great plains may extract moisture from as far as 70 to 90 feet from the trees. That has to be taken into account, but up to now root extension has not been a serious problem with us as we have more snowfall than in the southern United States, and the moisture from snow drifts compensates for the moisture withdrawn by the tree roots.

Senator STAMBAUGH: But would you advocate planting of strips across a field?

Dr. STAPLE: If one were recommending trees to prevent soil drifting they would have to be planted in a pattern, i.e., in rows 20 to 40 rods apart to give complete protection to the fields. The spacing would depend on the tendency of the soil to erode.

Senator MACDONALD (*Queens*): I am sorry to detain you, Mr. Chairman, I know you want to get on with the next brief, but I just want to ask this gentleman another question. Can you give us the average wheat yield in Saskatchewan?

Dr. STAPLE: No, I could not say exactly. The long-term average on fallow at Swift Current was 16 to 17 bushels per acre. I do not have the figures for the whole of Saskatchewan.

Senator MACDONALD (*Queens*): That is quite all right. Back in 1915, before I enlisted to go overseas in World War I, I went out on a big ranching farm in Alberta and I became the operator of a big threshing mill outfit, and we threshed 55 bushels of wheat to the acre. That was on 52 acres, and the yield was 55 bushels an acre, which I thought was a tremendous crop. But the average that fall that we threshed all around was in the neighbourhood of 40 bushels to the acre, and for oats it was 105 bushels, and barley the same. When I am down in my own little province of Prince Edward Island, and I read in the press about people in Saskatchewan who get an average of 12 to 17 bushels an acre I think they are starving. You may not think so, Senator Stambaugh.

Senator STAMBAUGH: But we know it.

The CHAIRMAN: Thank you very much, Dr. Staple. I am sure that the committee appreciate the information that you have given us tonight. We may have some more questions for you after Mr. Shields reads his brief.

Mr. Shields, will you come to my table and first let us have your background?

S. F. SHIELDS, Regional Director, Prairie Farm Rehabilitation Act, Swift Current, Saskatchewan:

Mr. Chairman and honourable senators, I was raised in southern Alberta 30 miles southeast of Lethbridge in the Warner district. I took my schooling close to that area and after graduating from university in Utah, specializing in agriculture and irrigation. In 1937, I went to Swift Current where I have been with the Canada Department of Agriculture, working with the P.F.R.A. on different irrigation projects in that area.

Mr. Chairman, my brief covers the subject of soil and water conservation activities of P.F.R.A.

The activities of the Prairie Farm Rehabilitation Act, which was passed by the Parliament of Canada in 1935, have been many and varied during the past twenty-five years. This program was introduced to assist farmers in the southern parts of the prairie provinces to overcome the effects of drought and

depression which had placed them in an adverse economic condition as compared with farmers in other parts of Canada. The Act was designed to conserve in the national interest the resources of prairie agriculture. During the first ten years, the activity of P.F.R.A. affected the livelihood of all farmers and livestock producers in the designated P.F.R.A. area. The cultural activity of P.F.R.A. was very significant as this work was conducted through the facilities of the dominion experimental farm service. Trained personnel under the experimental farm services had been working with prairie agriculture, from it had evolved studies and practices that could be helpful in the overall program of agriculture improvement in the various districts served by these stations. The broad program carried out can be briefly enumerated.

1. The Setting Up of Additional District Substations

These district substations were distributed so as to make available to all farmers in the P.F.R.A. area, such services in demonstration and experiment as would best aid them in solving local problems arising from the hazard of drought and soil drifting.

2. Land Reclamation Projects

This was done in connection with the reclamation of submarginal areas where the problem of soil drifting covered a wide area. Such areas were a detriment to crop land. The object of the work on these projects was to establish a grass cover for the permanent control of soil drifting with the hope that such areas would be permanently removed from cultivation.

3. Regrassing

Prior to 1935 it was noted that approximately 60% of the agricultural land in the prairie provinces was under cereal production; about 2% was under cultivated hay and annual feed crops; and the remaining 38% of agricultural land was used for grazing most of which was unsuitable for cultivation. With the timely introduction of crested wheat grass which was drought resistant, it indicated the possibility of use in those areas where light-textured soils were subject to the continual hazard of soil drifting. An extensive program of research, experiment and demonstrations on regrassing was carried out by the experimental farms with the following objectives:

- (a) The improvement of herbage on range land at present being used for grazing.
- (b) The greater use of grasses and legumes in farm cropping systems for the production of forage and especially for soil improvement.
- (c) The establishment of grass to replace weeds and control soil drifting on run-down pastures and abandoned farm lands.

With concentration on the above program, it is now estimated that the regrassing activities influenced about 3,000,000 acres of farm land up to 1945. The programs since this date have been improved and extended through the experimental farm services, and have influenced forage programs that have been put into effect by the provincial Governments in subsequent years. The program of research and plant breeding has been responsible for the improvement in varieties of grasses and legumes, and the development of new varieties which are greatly adding to the production of our pastures and feed reserves of the Prairie Provinces.

Grazing Research

This research program was an important phase of P.F.R.A. activity. Grazing surveys were undertaken, and it provided an inventory of our grass land

resources. These studies indicated the best use to be made of such areas in relation to soil type, moisture conditions and it helped in the overall planning of good land use. As conditions change and improvements are made, it has assisted in making broad recommendations as to good grazing practices in the various soil and climatic zones.

4. *Tree Planting*

This activity, with the object of improving living conditions on the prairie farms and providing shelter to gardens and buildings against strong winds, has been practiced on the prairies for a number of years. The forestry nursery stations at Indian Head and Sutherland, Saskatchewan were attached to the Experimental Farm Service after 1930. The program of tree planting was greatly accelerated after 1935 and this promotional work is still being carried out. Many communities became interested in the large scale shelter belt planting around farms, road side planting for winter snow fences as well as to reduce wind erosion and prevent excessive evaporation of soil moisture. Some variations of these early programs are still being carried out in many districts on the prairies.

5. *Soil Surveys*

Soil surveys in the Prairie Provinces had been conducted since 1921 but not too much progress made prior to 1935. With the inauguration of the P.F.R.A. Program, a concentrated effort was needed to secure a complete coverage of the drought area. This work was conducted in cooperation with the Soils Department of the Universities. This information has been most helpful and provides the necessary data for the study of some of our social and economic problems which have resulted from land settlement and taxation. The farmer is made aware of the nature of the soil resources of his farm and is better able to manage and make the improvements that are necessary from which he may receive increased economic benefits. Although the soil survey does not in all cases make a very detailed mapping of all farms, a detailed survey is necessary on lands now in operation on irrigation projects and particularly on newly proposed irrigation projects. If there are particular problem areas and investigations needed relative to economic problems, the detailed soil survey will continue to be needed.

6. *Soil Research*

Soil research under P.F.R.A. was of particular interest because of the establishment of the Soils Research Laboratory on the Swift Current Experimental Station. Other specialized work was undertaken by the Soils Departments at the three universities in the Prairie Provinces dealing with special P.F.R.A. projects. The details of this work have been well outlined by Dr. W. J. Staple, who has been associated with this work from the beginning. The personnel from the Soil Research Laboratory helped coordinate all of the above-mentioned activities of the cultural program under P.F.R.A.

During the early years of P.F.R.A., the cultural program was mainly directed to overcome emergency conditions. With improved weather conditions after the 1930's, along with the impetus of war-time production and the overall improved agricultural production during the 1950's, there has been a decided betterment in prairie agriculture. The cultural program has been directed to maintaining and improving these safeguards, so that prairie agriculture can be in a better position should there be any reoccurrence of similar drought conditions. Through the various agencies of extension, the farmers were quickly made aware of these programs.

7. *Economic Research*

In co-operation with the Agricultural Economics Division of the Canada Department of Agriculture, economic surveys were made in various areas to help in overall studies of land classifications, farm business studies, land settlement, farm machinery surveys and other special projects. Such detailed information has been most useful in evolving a land use program based on the experience of farmers in the areas where surveys were made. This work has greatly expanded, and, as additional information is needed, special studies are carried out. The information being made available through such studies influences the various agricultural policies that have been adapted for prairie agriculture.

BETTER LAND USE THROUGH PASTURE DEVELOPMENT

During the early settlement on the plains area, many farmers were located on lands poorly adapted for cultivation. With the years of drought, many of these settlers were forced to abandon their farms. This meant, with cultivation and subsequent abandonment of submarginal areas, there was a destruction of the original prairie grass and with drought such hazards as soil drifting and weed infestation became a menace to surrounding lands. With the amendment to the P.F.R.A. Act in 1937, the land utilization portion of this Act instituted the Community Pasture Program. This was the permanent removal of submarginal lands from cultivation, and the regrassing and improvement of such lands so that they could be added to the overall grazing resources. Agreements were entered into with the provinces of Saskatchewan and Manitoba, and this program has greatly expanded over the years. The provinces selected the areas to be developed and it was their responsibility to get control of these lands. The initiative of instituting a pasture program in a district frequently originated with the people and the municipality. Lands that had become abandoned and were taken back by tax lien forfeiture, were made available by the municipalities or taxation districts, along with provincial crown lands and other lands acquired by exchange or purchase. These lands were organized into a large block for pasture improvement. Many of these lands still remain in the name of the province and are turned over to the Government of Canada by a long-term lease agreement. Canada then agrees to construct, operate, maintain and improve the pasture in the area agreed upon. Sometimes it is necessary to move farm families from some of these areas and they are frequently located on better lands in the neighboring municipalities where they are better able to provide for themselves and family. Some farmers have been moved to some of the irrigation projects that were particularly developed for resettlement purposes.

The establishment of community pastures in Saskatchewan and Manitoba has been of increasing importance to the livestock industry. Pasture privileges have been made available to people adjacent to such areas and provide summer pasturage for the small livestock producer which helps him balance his agricultural operation. You will note from the recently prepared map which has been brought up to date for the fiscal year 1960-61 that there are now 68 pasture units in operation. I would point out on the map that this covers an area in Manitoba and Saskatchewan, enclosing some 68 pasture units, with 1,650,000 acres in Saskatchewan and about 280,000 in Manitoba, making a total of operating pasture units of about 1,933,834 acres. The area enclosed at present is 1,933,834 acres. Pasture privileges during this past year were made use of by approximately 6,500 patrons. These areas grazed approximately

123,000 head of livestock. At the present time, negotiations have been completed for the development and fencing of three community pastures in 1961. One of these is located in the south eastern portion of the P.F.R.A. area in Manitoba near Emerson. Two pastures will be constructed in Saskatchewan at Prairie Rose and Kelvington districts. Additional lands are frequently being added to these pasture areas either by direct purchase or exchange of lands.

The development and improvement of these lands within each pasture district requires the carrying out of many activities such as; fencing, improvement of abandoned lands by regrassing, and the installation of water facilities such as dugouts, stock watering dams, development of springs, etc. Considerable cross fencing is required so these large areas can be divided into fields for better operation and management. There is a total of 4,700 miles of fence in these pastures at present and each is equipped with the necessary corrals to facilitate the handling of livestock in and out of the pasture.

With the increased demand for grazing privileges it is necessary to carry out pasture improvement programs so these areas can carry the maximum amount of livestock. It is also necessary to manage them in such a way that the productivity can be maintained and improved.

A pasture improvement program is planned for each community pasture. In the open plains area, placing of stock watering facilities so that most areas can be grazed within a mile and a half of the availability of water is most important. Methods of conserving and utilizing available supplies of moisture for increased grass production are of particular interest. Some of these moisture conservation projects are developed within the pastures to take advantage of spring run-off using dyke systems for the distribution of spring run-off, contour furrowing and by deep pitting to hold as much moisture as possible from rain or snow fall. In the park land regions, there is competition from native trees and brush which are continually spreading over some of the better grass areas. The program of brushclearing is being undertaken and many new techniques in land clearing are being put into practice. A few of these can be mentioned briefly.

The use of heavy equipment with chain and cables pulled by heavy crawler-type tractors will knock down and wind-row heavy tree growth. The material is piled and burned. Brush cutting equipment is very effective where the growth is not over three inches in diameter. Controlled burning of standing growth and the use of herbicidal spraying by aircraft have been effective in undertaking some of this work. As soon as such areas are opened, native grass responds immediately, and effective means are being found to keep such brush growth in check. A study of the most suitable methods to clear brush land is under way at the present time. This type of improvement program will serve as a guide to the development of other grazing areas.

There has been considerable development in the prairie provinces in the organizing of smaller grazing units under the direction of municipalities, provincial community pastures, local grazing associations and other agencies. These groups outside of P.F.R.A. have been able to take advantage of improvement programs such as regrassing and water conservation within their own operated grazing units. The P.F.R.A. program in community pastures has greatly affected the livestock industry in these areas. A decided improvement in the quality of cattle now kept by pasture patrons is noted. Good quality breeding bulls are being provided by P.F.R.A., and some are rented from pasture patrons. The breed to be used is determined by the local pasture committees. This improvement in livestock quality influences many cattle outside the community pasture as many patrons have cattle in their own pastures at home. Careful attention is paid to the health of the animals in such areas, and provision is made for such

services as spraying for warble flies and horn flies, vaccination and other services that are requested by pasture patrons who pay for such services at cost.

In any planned program of the future where it is necessary to curtail cereal production there are many marginal areas that could be developed as a grazing resource.

(See Appendix 1, "Schedule of P.F.R.A. Community Pasture Rates", at page 182.)

WATER CONSERVATION

The importance of water conservation in the prairie provinces cannot be too strongly emphasized. Much information has been given to your committee in previous reports by Mr. G. L. MacKenzie, Director of P.F.R.A., Regina, in 1957 and Mr. George Spence, former P.F.R.A. Director and also a former Commissioner of the International Joint Commission.

During the past two years it has been relatively dry in the prairie provinces. Low run-off has been experienced in many areas, and we have seen a gradual drying up of small lakes. The water tables are greatly lowered, and many wells that farmers and ranchers depend on have failed. This situation has created a great demand for the building of domestic and stock watering facilities in all districts.

On April 1, 1959 increased assistance for these projects came into effect. This has greatly accelerated the building of new projects during 1959 and 1960. In order to provide a more adequate supply of water, it has been necessary to increase the size of these projects to insure a carry-over reserve for the second year in case of low run-off or excessive evaporation during a hot, dry season. In order to properly construct a farm dugout or a stock watering dam, the individual has to depend on large heavy equipment to do this work for him. The increased financial assistance has allowed many more of these projects to be built during the past two years.

Practically all of the farm homes have been electrified in the prairie provinces. As a result, most of the farmers have modernized the farm home and installed water facilities. This has increased the domestic water consumption, and it is necessary to provide for an assured water supply. The betterment of family living with electrical power and water supply will do much to maintain the family farm unit. The number of individual projects constructed in any one year to date will likely be the highest on record by March 31, 1961. The expenditure for these individual projects will exceed \$1,000,000.00. The total number of individual projects constructed to date is estimated to be approximately 70,000.

Appendix 2 is a map which shows the small water projects constructed as indicated in the last annual report of March 31, 1959. This type of map is brought up to date each year. Since this map was prepared, the number of small water projects have been increased by approximately 10,000 during the 1959 and 1960 seasons. (For Appendix 2 see page 183.)

Appendix 3 outlines in detail the financial assistance given on water conservation projects. (For Appendix 3 see page 184.)

COMMUNITY WATER STORAGE PROJECTS

From 1951 to 1957, due to favorable moisture conditions, small lakes on the prairies were at a high level. With the drying up of such bodies of water in the past three years, there has been an ever increasing demand for establishing community storage projects. At the present time, there are over 800

storage projects which have been constructed under P.F.R.A. assistance. Many towns and villages find this the only source of domestic water supply. In 1959 and 1960 many of the storage projects in southern Saskatchewan were the only source of water from which farmers could fill their tanks to do their herbicidal weed spraying on their fields. In the establishment of new composite schools in rural communities, a regulation in the province of Saskatchewan stipulates that such schools must be equipped with running water and flush toilets. The same regulations apply to regional hospitals serving the rural areas. In the matter of Civil defence, there is a growing awareness to have an adequate supply of water to provide fire protection.

In any Rural Development Program in the prairie provinces assured water supply is essential if business and industry are to develop in our smaller communities. We have seen many of our small towns, serving rural communities, decrease in size as business firms move away because of the failure of water supply. The present means of supplying water by the building of storage reservoirs may not provide sufficient water for some of these communities and districts, and other means would have to be provided such as bringing water in a great distance by pipeline. Some studies and investigations are being made at the present time in the province of Saskatchewan in regard to serving these communities with a more adequate water supply.

LARGE COMMUNITY PROJECTS

The large community projects which are established on the main water courses are usually classed as multi-purpose. Many developments on some of these projects such as irrigation, stock watering, regulated stream flow, prevention of flooding, etc., bring benefits to a large number of people. I would like to refer to the extensive development from the Cypress Hills Watershed located in southeastern Alberta and southwestern Saskatchewan. There have been constructed twenty storage reservoirs with a combined storage capacity of approximately 350,000 acre feet. It is estimated that when fully developed approximately 100,000 acres will be able to grow irrigated feed crops and some fringe areas will receive the benefit of controlled spring flood. Anyone familiar with the Cypress Hills and adjacent areas knows of the livestock economy which exists in this location. This type of program has given an assured feed and water supply to livestock producers in this region and with grazing resources from community pastures it has brought about a good balance with dry land agriculture. There are many other such watershed developments in the prairie provinces that are now under study. With the increased use of pump and sprinkler irrigation systems, many small areas can be served where there is a continual flow of water during the growing season. It has been stated that we are only just beginning to get well acquainted with the development of our water and land resources in the prairie provinces.

The large storage projects which have been developed in Alberta, and the Saskatchewan project now under construction makes us fully realize the importance of the benefits that will be far reaching to future generations. Such projects bring about considerable change in the activity of the farmer concerned. Plans must be carefully made so that, with new techniques of land development, the adjustment into irrigation farming will not be too difficult, and the increased expenditures required can be met satisfactorily. A redistribution of land and the changing or planning of a farm-sized unit on these larger projects must be given thoughtful consideration. The experience of P.F.R.A. has shown that many farmers may need only an additional 60 to 80 acres of irrigable land on which they can grow feed in order to maintain their livestock, and it will balance out their present dry land operations. Many of

them are willing to travel a distance of twenty miles to look after a small irrigable unit in order to insure themselves of an adequate feed supply. The present lands that may come under irrigation development on the larger irrigation projects could serve a large number of farmers in addition to those who will reside on the irrigable farm units.

All of the various types of water conservation projects are a result of the study and planning of many agencies. The wide range of engineering services provided by P.F.R.A., which have been outlined in detail to you in previous briefs, has brought the study of projects to a point where decisions can be made by the Provincial Governments concerned.

The investigation of projects covers a wide field so that all of the benefits can be properly assessed. This type of over-all study and planning involves many departments of government, and to this is added the expression of people who will ultimately be the benefactors. It is necessary at all times to have the people concerned well informed. The development of any schemes, whether large or small, will progress only as fast as the organized demands of local people. All avenues of publicity should be used so that the people who will benefit under any conservation scheme are ready and anxious to participate. The publishing of the annual P.F.R.A. reports, which are widely circulated, brings us up to date with the yearly activities carried on by P.F.R.A. It is expected that the annual report for 1959-60 will soon be in circulation. At the present time, all the material is being assembled in preparation for the 1960-61 annual report.

REHABILITATION AND RESETTLEMENT

The record of any program cannot be measured by the statistical data in its annual reports without showing how it has affected the livelihood of individuals. Sometimes problems are easily enumerated, but it takes a considerable amount of study to bring together all the facts concerning the resources available. When such facts are presented to each individual, they have an opportunity of studying the various alternatives and making a decision for themselves. In this regard, the program of rehabilitation or improvement is a continuing one of education and program action. It is by getting some of these programs of P.F.R.A. underway that many farmers facing adverse conditions have brought about stability to their own agricultural operations. This can be best illustrated by a study being made of one of our districts to determine the feasibility of moving some people from a dried-out area to one of the irrigation projects.

A young farmer, a veteran of World War II, was visited, and it was noted that he was on a small farm unit and was having difficulty in providing a livelihood for his family. There was a possibility that he could buy some additional land, but this deal would not be approved by the Veterans Land Administration because the record of crop production was not too favorable. It was noted that a well established water course went through some of his holdings, and he was encouraged to apply for a water conservation project. After a survey was completed, it indicated that he could develop a flood irrigation scheme of approximately 40 acres and provide sufficient feed to keep a small herd of cattle. He lived close to one of the provincial community pastures and had summer grazing privileges. When he had completed developing his water conservation project a loan from V.L.A. was approved, and he has become quite well established on a good balanced unit.

A wide range of resettlement activities have been effective in the development of some of the small irrigation community projects. At the present time, P.F.R.A. have agreements on projects located in Southern Saskatchewan

at Val Marie, Eastend, Maple Creek, Consul and Swift Current areas with over 800 farmers. These projects have been developed on lands only suitable for the production of forage crops. The lands have been subdivided into units of approximately 40 acres in size. Such type of development has given them a reserve of feed by which they can maintain their basic livestock herds. This may only supplement their needs, and it is hoped that by other water conservation projects on their own farms, and by planning ahead for their own needs, they will be in a favorable position to maintain a balance between livestock and cereal production. These projects are ones in which land is acquired for development by P.F.R.A. In recent years many storage projects have been built with a plan to develop lands which can be irrigated. It is left in the hands of owners to work out a procedure with the provincial Government to develop their land. Such schemes have not progressed too rapidly, and it points out the need, as heretofore mentioned, of a more realistic land control and development policy.

Irrigation projects in Alberta were used for the resettlement of farmers from serious drouth areas. In the period of 1939 to 1941, 156 families were moved from southwestern Saskatchewan to the rolling hills district south of Brooks, Alberta. This group of farmers became well established and soon adapted themselves to irrigation farming. The rapid improvement in their net worth was also due to increased agricultural prices and favorable markets during war years.

An area on the Bow River Project, which was taken over by Canada in 1950, was set aside for the resettlement of farmers from the drouth areas of Alberta and Saskatchewan. Of the 150 families now on this project located in the Hays district approximately 100 were selected from some of the very dry areas, many from around the fringe areas of community pastures and other pasture districts. They were selected on the basis of need as their units were small, of poor quality soil and no possibility of expanding the size of their farm operation. They exchanged their land for a unit on the Bow River Project and were assisted to move their effects. Many have been there for a period of five years or more and have become well established, and an economic study indicates a great improvement in their net worth.

Many of these settlers in their former location had become recipients of social aid. Their lands would soon have become badly encumbered with debt and taxes, and many of them lived in isolated districts where schooling and other facilities were becoming difficult. The lands they moved from, which have been transferred to Canada, have been regressed and become part of the pasture programs in the district. All such lands received under the resettlement scheme had for many years been receiving payments under the Prairie Farm Assistance Act. A survey indicated that over a period of years since 1939 the Government of Canada has paid out an average of over \$10.00 per acre in dry yield bonuses. It is hoped that corrective measures may in the future help to bring about a better adjustment in prairie agriculture through renewed activity in soil and water conservation projects.

The CHAIRMAN: This is an excellent paper, sir. Thank you very much. I wonder if you would explain the figure in the appendix of three and one half.

Mr. SHIELDS: Three and one half cents a day; that is a daily rate.

Senator McGRAND: What is the size of the pastures—how many acres?

Mr. SHIELDS: They vary in size. The smallest is about 10,000 acres, and some of them go as high as 120,000 acres. All of those areas have been cleared of settlement, and these were the areas that were taken over and improved for the community pasture program.

Senator McGRAND: How many acres would it take to pasture a cow; or how many cows to an acre would those pastures take?

Mr. SHIELDS: In the very dry areas in Saskatchewan the grazing rate was estimated on native grass at 40 acres per head, but because of re-grassing activities it has increased and it is now rated at around 25 acres per animal unit.

The CHAIRMAN: Do you use fertilizer on these pastures?

Mr. SHIELDS: No, not dry native pasture it is not feasible.

Senator HIGGINS: What trees are grown?

Mr. SHIELDS: Those that were referred to by Dr. Staple were supplied by the forestry nursery station. The chief one is the caragana tree. It will grow quite high, with close planting provides a good windbreak. The roots penetrate down a great distance, and it can resist adverse conditions better than any other trees on the prairies.

Senator STAMBAUGH: They grow very rapidly, too.

Mr. SHIELDS: That is right.

Senator McGRAND: On the question of fertility of soil, has any effort been made in Canada to use natural sewage from the cities that come out in the rivers?

Mr. SHIELDS: I do not know of any. Dr. Staple may be able to answer that, but to my knowledge it is not used as fertilizers.

Senator McGRAND: No attempt has been made to use it in Canada?

Mr. SHIELDS: Not that I know of.

Senator TAYLOR (*Westmorland*): Pastures of this kind are practicable in any part of Canada, and I think they should be promoted in all parts of Canada. I am wondering if you have to re-grass this area at all in the west?

Mr. SHIELDS: The areas you see on the map were those reclamation areas that were giving us trouble. They were a menace to the good lands around and we had to re-grass the abandoned drifting areas. As a matter of fact, the bulk of the acreage of those pastures is native range, and with good management practice carried on, the productivity has increased with water conservation projects.

Senator TAYLOR (*Westmorland*): In eastern Canada we try to keep soils like that continuously in pasture year after year but find in later years that by re-seeding every fifth or sixth year, or ever sooner, we get better results by building up a certain amount of humus in the soil.

Mr. SHIELDS: There is nothing better than our native range, with proper management.

Senator TAYLOR (*Westmorland*): In the appendix, you refer to the charge that is made. Does the province enter into this at all?

Mr. SHIELDS: No, this is the exact charge the patron pays to P.F.R.A. for grazing and other services.

The CHAIRMAN: The provincial government takes part in some of its own projects, does it?

Mr. SHIELDS: Yes. As I mentioned in my report, Mr. Chairman, there are many other areas that are maintained by the provinces, areas less than 10,000 acres, organized into municipal pastures or grazing associations, some co-operative grazing associations.

Senator STAMBAUGH: Does the province not have some provincial pasture?

Mr. SHIELDS: They have in all provinces.

The CHAIRMAN: Is the charge the same as these?

Mr. SHIELDS: It is fairly comparable.

Senator STAMBAUGH: Take the Bow River project. Has most of the land suitable for irrigation that can be carried by the present water supply been taken up?

Mr. SHIELDS: There is a small addition in this past year added to the Hays district.

Senator STAMBAUGH: Is that the project that covers Vauxhall?

Mr. SHIELDS: Yes.

Senator STAMBAUGH: What percentage of those people met with success?

Mr. SHIELDS: I think only about five people have withdrawn from the project. In the Rolling Hills district the percentage was even better, but they were resettled during the war years when hog production and other agricultural prices were on an improved scale.

The CHAIRMAN: In establishing some of your pastures do you have any difficulty in moving some farmers out of there? Do you have trouble with expropriation, or anything like that?

Mr. SHIELDS: The policy of course with P.F.R.A. is that the province acquires the land and makes it available. If there is anything we can do to establish families on an irrigation project we do it, or if the province has some better quality land they can move the family to it, such arrangements have always been satisfactory.

Senator TAYLOR (*Westmorland*): Where you move such large groups of people such as the movement you suggested of 150 families, do you have any trouble in moving them?

Mr. SHIELDS: There was no trouble at that time, because in the drought areas they were only too happy to go somewhere else. Before they were moved they were given an opportunity to visit the irrigation project and investigate other lands available for exchanging, and it helped them to clear off their indebtedness and to better improve their economic position.

Senator TAYLOR (*Westmorland*): In other words the initiative was taken by the P.F.R.A.?

Mr. SHIELDS: In co-operation with the provinces.

Senator TAYLOR (*Westmorland*): And what happened to the property that these people owned before you moved them? Did the Government take it over?

Mr. SHIELDS: It all went into pasture and added to the grazing resources.

The CHAIRMAN: During the 1930's, a number of farmers I know in Saskatchewan abandoned their moderately good wheat lands, and moved up in the north country. Did many of those people come back?

Mr. SHIELDS: No. Most of them stayed in the north, and became quite well established. However if some settled on light land and after it was cleared of trees they had to be careful of wind erosion. Many of the northern districts became good forage seed producing regions.

Senator MACDONALD (*Queens*): Mr. Chairman, there has been a lot said in the brief about water conservation. If the individual farmer located in Alberta or Saskatchewan is running short of water does he bore deeper to try to get a deeper source?

Mr. SHIELDS: It is not always possible to get an adequate supply of water by drilling wells. There is a great deal of information from the geological survey that indicate the possibility and depth to drill for water. Even if he gets an adequate supply he cannot always be sure of the quality. The best source of water supply is from surface run-offs, storing it in small reservoirs or dugouts.

Senator MACDONALD (*Queens*): The conditions in your part of the country must be entirely different to what they are in Prince Edward Island where I come from.

Senator STAMBAUGH: It is only surface water you are dealing with at the present time?

Mr. SHIELDS: Yes.

Senator HIGGINS: Is there any good farmland up by Lake Arthabaska?

Mr. SHIELDS: We are told that there are many good areas of land in areas like that, but it is too far away from existing transportation facilities to be opened for settlement at the present time. The provinces will not allow settlers to go into those areas because of the great expense of maintaining services to them.

Senator HIGGINS: Of course there would not be any shortage of water there.

Mr. SHIELDS: No.

Mr. STUTT: Have you had many cases in the last 10 years of the movement of settlers to irrigated lands from the southwest? You mentioned in 1937 through the 1940's you did have, but what about the last 10 years?

Mr. SHIELDS: There have not been too many except for the small group of 100 settlers who moved to the Bow River settlement.

Mr. STUTT: They were moved in the 1940's?

Mr. SHIELDS: In the 1950's the last one hundred were moved to the Bow River project. It would seem with improved moisture conditions in the 1950's there was a lot of land readjustment that took place naturally, by a young farmer buying out his neighbour and so on and getting a better sized unit. The trend in the Prairies has been towards larger and more efficient units, and improved economic conditions have brought that about.

Mr. STUTT: I suppose the boundaries of the community pastures are continually being changed, are they not?

Mr. SHIELDS: Yes. Sometimes the lands that are added are provincial Crown lands, sometimes older farmers who are retiring are desirous of selling their land, and it is purchased. A considerable area has been added to each pasture since it originally was established.

Senator STAMBAUGH: Has the St. Mary's project taken up nearly all the available water supply for irrigation?

Mr. SHIELDS: At the present time, Senator Stambaugh, additional storage is being provided by the construction of the Waterton Reservoir which will complete the over all storage for the St. Mary's Project.

Senator STAMBAUGH: That is what I understood, that they need more available storage facilities in order to take care of more land that will be available?

Mr. SHIELDS: That is right.

Senator STAMBAUGH: Will that storage be in the park?

Mr. SHIELDS: The storage is right near the town of Hillspring, which is about 12 miles down river from the park.

Senator CAMERON: Is there any contemplation of developing the Pearce scheme?

Mr. SHIELDS: This is also known as the Red Deer River scheme, on which a good deal of survey work has been done. It was first thought of as a diversion for carrying water over to a large area of land which embodied a lot of stock watering and small community projects. It is necessary to undertake a detailed soil survey, to properly assess its value, and after all the studies are made a decision as to its feasibility will be made by the Province of Alberta.

Senator STAMBAUGH: That is more of a stock watering project and not irrigation, is it not?

Mr. SHIELDS: That is right. It was designed by the late Sir William Pearce as a stock-watering scheme, and it involved a lot of area with many community storage reservoirs and land to be irrigated for production of feed crops.

Senator STAMBAUGH: I think there has been considerable false information circulated that it would be an irrigation scheme but that is not correct.

Mr. SHIELDS: That would depend on the amount of good land, and when the detailed soil survey is completed then they can best assess the value of that project.

Senator HIGGINS: I suppose it would be hard to get a good day's fishing in the prairie provinces judging by the lack of water.

Mr. SHIELDS: I would say that most of these community projects that I have referred to are becoming places of recreation and stocked with fish.

Senator HIGGINS: I come from the province of Newfoundland and as you know we have a vast amount of water there.

Mr. SHIELDS: Mr. Chairman, I would like to extend an invitation on behalf of P.F.R.A. to the honourable senators to visit the projects and see the development being undertaken by P.F.R.A. We would be happy to show you the many types of development covering all phases of our activity.

Senator TAYLOR (*Westmorland*): Mr. Shields, are you familiar with eastern Canada?

Mr. SHIELDS: Not too well.

Senator TAYLOR (*Westmorland*): I have this idea in my mind and everybody may not agree with me but I think we are fast approaching the time when people living today will see the time when we can only afford to farm the best soils in our country.

Farmers today are trying to work much of this marginal farm land which, speaking for the province of New Brunswick, will never be feasible as a farm operation. I am wondering how we go about persuading these people to leave these marginal areas, to go on to better soil, and let the land go back into forests, or develop community pastures or something else.

How would you suggest we go about correcting that situation?

Mr. SHIELDS: Mr. Chairman and honourable senators, I had the opportunity of appearing before you last year along with Dr. Booth, Mr. Stutt and Mr. Barrett, to tell you of our study of the rural development in the United States. Visits were made to areas when conditions were comparable to those which you have mentioned. It is proposed that the people be made aware of their situation and study ways of bringing into effect a better land use program. It is necessary to study all the resources available with emphasis on human resources.

A lot of thoughtful planning is going on at the present time and the people involved, after becoming well informed, will work into these changes gradually. A great deal of information is available and from it they can be guided and encouraged to participate in projects for their betterment.

Senator TAYLOR (*Westmorland*): That points up the great importance of completing the soil survey.

The CHAIRMAN: Yes.

Senator MACDONALD (*Queens*): One final question. Some mention was made in the brief about the land required to pasture stock. If you had 100 steers to be fattened on the prairie, what acreage would you require for a summer season?

Mr. SHIELDS: For a summer season our grazing surveys indicate, it takes 10 to 15 acres per head in northern areas when moisture conditions are more favorable, and in southeastern Alberta or southwestern Saskatchewan we would need 30 to 40 acres per head.

Senator MACDONALD (*Queens*): My advice to you is to move to Prince Edward Island.

Senator TAYLOR (*Westmorland*): Mr. Chairman, may I move a vote of thanks to these gentlemen for their presentation and helpful discussion this evening.

The CHAIRMAN: Thank you. This will be the last meeting of the committee until about April 26.

The committee adjourned.

APPENDIX 1

SCHEDULE OF P.F.R.A. COMMUNITY PASTURE RATES

(Effective April 1, 1961, and until further notice on
all stock entering the pasture on or after that date)

CATTLE per day per head.....	\$.03 $\frac{1}{2}$	
HORSES per day per head.....	.04 $\frac{1}{2}$	
SHEEP per month per head.....	.11 $\frac{1}{2}$	(provide own herder, no charge for lambs)
COWS (breeding service).....	4.00	per head
CALVES of current year, sucking, with dam, born before August 1....	3.50	per head
COLTS of current year, sucking with dam, born before August 1....	4.50	per head
Minimum Grazing Fees per head per season:		
Cattle.....	4.00	
Horses.....	5.00	
Sheep.....	.40	

No charge will be levied on colts and calves born in pasture after July 31st of current year to end of summer season.

No stock will be accepted for pasturage before May 1st of current year.

RATES FOR VACCINE AND SUNDRY SERVICES

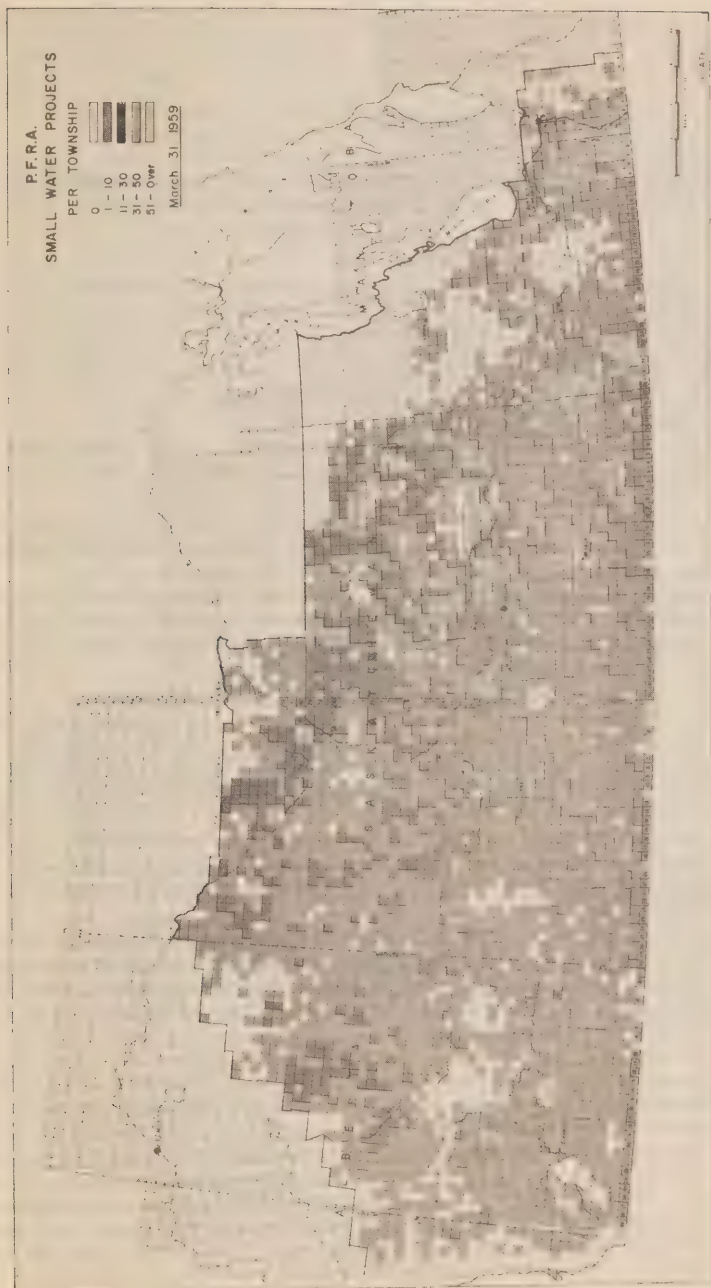
Blackleg, Hemorrhagic and Mixed Vaccine.....	\$.15 per single dose
Dehorning.....	.50 per head
Warble and Horn Fly spraying (treatment at corral).....	.15 per head
Mineral Supplement.....	.35 per head
Castration: Cattle under 6 mos.....	1.00 per head
Cattle mos. and over.....	2.00 per head
Encephalomyelitis and Special Vaccines.....	At cost

Where extra hay or wood in community pastures are available, the following rates will apply, subject to approval of pasture manager and confirmation from head office.

All hay must be put on share basis, such to be governed by quality and quantity available.

Dry Wood.....	\$.50 per cord
Green Wood.....	1.00 per cord

APPENDIX 2



APPENDIX 3

OUTLINE OF ASSISTANCE PROVIDED FOR WATER DEVELOPMENT
UNDER THE PRAIRIE FARM REHABILITATION ACT

(effective April 1, 1959)

The water development programme under the Prairie Farm Rehabilitation Act provides (a) engineering service and (b) financial assistance for farmers residing in the P. F. R. A. Area of the Prairie Provinces.

(a) Engineering service is furnished free to the extent that staff is available, upon application to the Chief, Agricultural Division, P.F.R.A., Regina, Saskatchewan.

(b) Financial assistance as outlined on the reverse side of this page is paid on water development projects when the following terms and procedure are observed.

- (1) Application for assistance must be submitted on a form provided for the purpose to the Chief, Agricultural Division, P.F.R.A., Regina, Saskatchewan.
- (2) The construction of all projects *except dugouts* must be authorized under the Water Rights Act of the Province of which they are located. Applications for Water Rights must be submitted for such projects, as well as applications for assistance.
- (3) An applicant for financial assistance must advise the date upon which actual construction of the project will begin. If possible such date should be stated on the regular application form. When the date of construction is not stated on the application form, the farmer must give notice of it by letter, or by other means, not more than thirty days before the work commences.
- (4) All projects must be constructed according to specifications. Dugouts must be excavated according to instructions; other projects such as stock watering dams and irrigation works must be completed to conform to filed plan.
- (5) The acceptance of any application for financial assistance is conditional upon the project being constructed satisfactorily in every respect, and such acceptance is not final until the completed project has been inspected and approved by officers of the Administration of the Prairie Farm Rehabilitation Act.
- (6) No financial assistance can be paid on any project after the funds available each year have been fully expended. Payments in any year are entirely on the basis of priority, and are subject at all times to funds being available for them.
- (7) The acceptance of any application for financial assistance is effective only to March 31st, next, following the date of such application. When any works on which construction has commenced are not completed on or before March 31st next following date of application, payment of financial assistance is contingent upon funds being voted by the Canadian Parliament for the ensuing year.

FINANCIAL ASSISTANCE

1. *On projects for individual use*

- (a) *Dugouts*: 7 cents per cubic yard for earth excavated, to a maximum of \$250.00.
- (b) *Stock Watering Dams*: 7 cents per cubic yard for earth excavated plus 25 cents per cubic yard for rock work and cost of materials purchased, to a maximum of \$300.00 including earth, rock and materials.
- (c) *Irrigation Projects*: 7 cents per cubic yard for earth excavated plus 25 cents per cubic yard for rock work and cost of materials purchased, to a maximum of \$600.00 including earth, rock and materials.
- (d) *Repairs*: Financial assistance for repairs of small projects may be recommended where required as a result of flood damage or other natural causes within one year after the project is completed, on the basis of 7 cents per cubic yard for earth and 25 cents per cubic yard for rock work and cost of materials, to a maximum not exceeding 50 per cent of the total financial assistance previously paid from P.F.R.A. Consideration may be given to extending the one-year period where there is evidence that a project has not been filled to capacity within one year after completion owing to limited runoff. Assistance for repairs must be limited to repairs of works previously covered by financial assistance from P.F.R.A. and must not include any expenditures for enlargements or betterments.
- (e) *Enlargements, Improvements or Betterments*: Financial assistance may be recommended for enlargements, improvements or betterments of small projects where it is found advisable to increase the capacity or insure greater safety, provided the maximum, including all previous payments, does not exceed \$250.00 for a Dugout, \$300.00 for a Stock Watering Dam, \$600.00 for an individual Irrigation Project and \$1,000.00 for a neighbour project.

2. *On neighbour projects*

Where two or more individuals may find it to their advantage to pool their water resources, financial assistance may be provided on the same unit basis as for an individual project but to a maximum of \$1,000.00, including earth, rock and materials.

3. *On small community and municipal projects*

Application for small community projects submitted by municipalities or other legally organized bodies such as Water Users' Association, may be given financial assistance on the basis of cost where approved and authorized by the Minister. Where such applications are approved the municipality or organization assumes responsibility for the construction of the project and for the maintenance and operation when completed. The applicant is also required to obtain control of the necessary right-of-way to make the project available to the community.

4. *On larger community projects*

Larger community projects including stock watering and irrigation are dealt with according to merit of each after complete surveys have been made and agricultural value and engineering feasibility determined.

Address all communications to:
Chief, Agricultural Division,
Room 412, Motherwell Building,
P. F. R. A.,
Regina, Saskatchewan.

JAN 2 1965



Fourth Session—Twenty-fourth Parliament
1960-61

THE SENATE OF CANADA

PROCEEDINGS OF

THE SPECIAL COMMITTEE OF THE SENATE

ON

LAND USE IN CANADA

No. 8

WEDNESDAY, APRIL 26, 1961

THURSDAY, APRIL 27, 1961

The Honourable Arthur M. Pearson, Chairman

The Honourable Henri C. Bois, Deputy Chairman

WITNESSES:

Mr. J. S. Parker, Director, Maritime Marshland Rehabilitation Administration; Mr. Ross Hill, The Maritime Federation of Agriculture and Mr. Roy Grant, Secretary, The Maritime Federation of Agriculture.

CANADA DEPARTMENT OF AGRICULTURE

Dr. C. C. Spence, Economics Division, Edmonton, Alberta, Dr. J. C. Wilcox, Research Station, Summerland, British Columbia, and Dr. G. C. Russell, Experimental Station, Lethbridge, Alberta.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Higgins	Power
Basha	Horner	Smith (<i>Kamloops</i>)
Bois	Inman	Stambaugh
Boucher	Leger	Taylor (<i>Norfolk</i>)
Bradette	Leonard	Taylor (<i>Westmorland</i>)
Buchanan	MacDonald	Turgeon
Cameron	McDonald	Vaillancourt
Crerar	McGrant	Wall
Emerson	Méthot	White—31.
Gladstone	Molson	
Golding	Pearson	

(Quorum 5)

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

"The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Bois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—

Resolved in the affirmative."

J. F. MacNEILL,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

WEDNESDAY, April 26, 1961.

Pursuant to adjournment and notice the Special Committee of the Senate on Land Use in Canada met this day at 11.00 a.m.

Present: The Honourable Senators:—Pearson, Chairman; Bois, Deputy Chairman; Barbour, Basha, Gladstone, Golding, Inman, McGrand, Stambaugh and Taylor (*Norfolk*).

In attendance: Mr. Ralph A. Stutt, Special Consultant to the Committee, and the Official Reporters of the Senate.

Mr. J. S. Parker, Director, Maritime Marshland Rehabilitation Administration, Canada Department of Agriculture, presented a brief, was heard and questioned.

Mr. Ross Hill, representing The Maritime Federation of Agriculture, presented a brief, was heard and questioned.

Mr. Roy Grant, secretary, The Maritime Federation of Agriculture, was heard and questioned.

At 12.45 P.M. the Committee adjourned until Thursday, April 27th, 1961, at 11.00 a.m.

THURSDAY, April 27, 1961.

At 11.00 a.m. the Committee resumed.

Present: The Honourable Senators:—Pearson, Chairman; Bois, Barbour, Basha, Boucher, Buchanan, Golding, Horner, Inman, Leonard, MacDonald, McGrand, Molson, Smith (*Kamloops*), Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon and Vaillancourt.

In attendance: Mr. Ralph A. Stutt, Special Consultant to the Committee, and the Official Reporters of the Senate.

The following witnesses from the Canada Department of Agriculture, presented a brief and were severally heard and questioned:—

Dr. C. C. Spence, Economics Division, Edmonton, Alberta.

Dr. J. C. Wilcox, Research Station, Summerland, British Columbia.

Dr. G. C. Russell, Experimental Station, Lethbridge, Alberta.

At 12.30 P.M. the Committee adjourned to the call of the Chairman.

Attest.

James D. MacDonald,
Clerk of the Committee.

THE SENATE

SPECIAL COMMITTEE ON LAND USE IN CANADA

EVIDENCE

OTTAWA, Wednesday, April 26, 1961

The Special Committee on Land Use in Canada met this day at 11 a.m.
Senator Arthur M. Pearson in the Chair.

The CHAIRMAN: Honourable senators, it is now 11 o'clock and as we have a quorum we will start in right away.

This morning we are going to hear from Mr. J. S. Parker of the Maritime Marshland Rehabilitation Administration, of the Canada Department of Agriculture. Then we also have with us this morning Mr. Ross Hill representing the Maritime Federation of Agriculture.

Mr. Parker will address us first and then we will call on Mr. Hill afterwards to give us his views on the subject.

Following Mr. Hill's presentation there will be questions, as usual, and if any senator particularly wants some question answered while the presentations are being made that will be in order.

Mr. Parker, may I ask you to give us a little background first as to your education and career.

J. S. Parker, B.E., Director, Maritime Marshland Rehabilitation Administration, Canada Department of Agriculture: Mr. Chairman and honourable senators, it is a privilege for me to be here this morning and meet with you. I do so as a representative of the Canada Department of Agriculture.

Your chairman has asked me to give some of my background. I may say that I was raised in west central Saskatchewan and graduated from the University of Saskatchewan in agricultural engineering.

The CHAIRMAN: You must be a good man, then.

Mr. PARKER: Not necessarily, Mr. Chairman.

Beginning in 1938 I worked with the Canada Department of Agriculture, being employed at the experimental station at Swift Current. After my war service I returned there, and in 1949 I was asked to move to Amherst, Nova Scotia, to head a new special branch of the department, the Maritime Marshland Rehabilitation Administration, somewhat of a sister organization to the Prairie Farm Rehabilitation Administration with which you are well acquainted.

I will now read from this brief which I have prepared.

GENERAL REMARKS ON THE RECLAMATION AND DEVELOPMENT OF MARSHLAND AREAS OF THE MARITIME PROVINCES

I propose this presentation will review what is being done, and what has already been accomplished, towards the reclamation of tidal marshland areas of the Maritime provinces, with specific reference to activities under the Maritime Marshland Rehabilitation Act which was passed by Parliament in 1948.

The Act provides for assistance to the Provinces of New Brunswick, Nova Scotia and Prince Edward Island in the reclamation and development of agricultural lands subject to tidewater flooding. These areas are of a comparatively

level topography and are located adjacent to tributaries of the Bay of Fundy. Others of slightly different characteristics are located near Saint John, N.B., Yarmouth, N.S., along Northumberland Strait and on Prince Edward Island. The latter groups are not considered to be the typical Maritime marshland areas.

I have included in the brief a map and you will observe the location of the Bay of Fundy. The cross-hatched areas represent areas of marsh generally; the heavy coloured areas show where we have concentration of projects which have been undertaken by the Canada Department of Agriculture in co-operation with the provincial departments of agriculture.

The main centres are Moncton, Hillsboro, Albert, in New Brunswick, and Amherst, Truro, Windsor, Kentville and Annapolis Royal in Nova Scotia, with a scattering at Yarmouth, a little bit at Saint John. There is some marshland scattered along the shores of Northumberland Strait.

Of approximately 110,000 acres of marshland in the three provinces there are now about 80,000 acres protected, and it is expected this figure will be increased by 1000 acres this year. Of the total now protected, 11,000 acres or 13.7 per cent was land out to tide, i.e. subject to frequent salt water flooding, in 1949. It is doubtful additional areas of consequence will be reclaimed in the near future. By provinces, protected acreages are as follows:

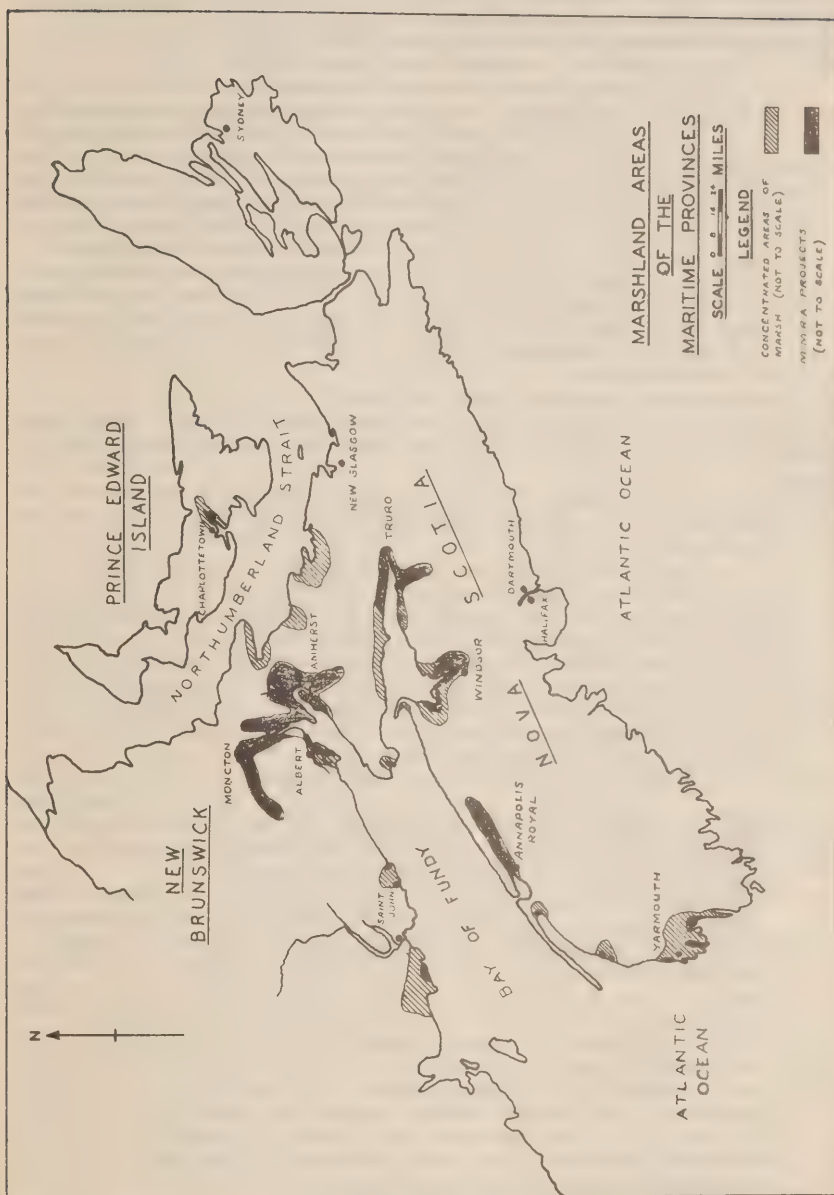
Nova Scotia	43,000- acres
New Brunswick	37,000 acres
Prince Edward Island	275 acres

One hundred and twenty-three projects are involved ranging in size from 30 acres to 18,000 acres. They form parts of property belonging to approximately 3800 persons, and are an integral part of an estimated 450,000 acres of farmland. They comprise 7.8 per cent of the crop land of Nova Scotia and New Brunswick. A marshland area in the maritimes can supplement an upland area just as an irrigated plot contributes to a successful dry land farm on the prairies.

Perhaps you will be interested in some background detail. The main marshland soils formed as fluvio-marine deposits along tidal rivers flowing into the upper reaches of the Bay of Fundy, and the Bay itself. Over long periods, deposition of silt from that carried in suspension by tide waters has resulted in build-up of silt beds. At further stages of accumulation, these beds were built up to a level which was above the lower high tides and thus remained dry during a part of the tide cycle. Dikes are required to protect the areas from flooding during periods of high tides.

When first diked the soil is too saline to support any but salt tolerant species of plants. After a few years of normal leaching, some economic crops will grow and eventually most crops suitable to the fine textured soils, can be grown provided adequate drainage is supplied. Marshland soils are much more fertile than the adjacent upland soils, but available phosphorous and nitrogen are often in short supply, although analyses would indicate that soils limed to pH 6.5 or vicinity have a high level of available phosphorous. Liming is essential for all soils which have been diked for a number of years if good crops of hay and legumes are to be grown.

Marshland soils are moderately fine to fine textured, nearly level, stone free and fertile. They usually require some form of artificial drainage and must be diked before economic crops can be produced. When drained they are excellent soils for hay and grain and may be used for pasture when well sodded. Additional detail on utilization follows later in this presentation.



Also of interest may be a description of the general situation pertaining to these areas as it was found in 1950 by G. Haase and D. J. Packman of the Economic Division, Canada Department of Agriculture, and recorded in the report "Marshland Utilization in Nova Scotia and New Brunswick".

The history of production on the marshlands does not present a record of continuous and uniform development. Settlement progress and political developments had a marked bearing on the various stages of expansion of the areas protected from the sea. The first marshes to be enclosed were used almost entirely for the production of wheat and other cereal crops during the first three or four years of cultivation. Once the food requirements of the new settlers had been assured, cultivation of the marsh areas was extended; hay followed the grains in a crop rotation and made possible an increase in livestock numbers.

The writings of John Young¹ contained many references to early farming on the marshlands of Nova Scotia. He described the early emphasis on wheat and other cereals and noted that a little later, between 1720 and 1820, the marshes of the Grand Pré were alternately under wheat and grass.

The CHAIRMAN: Where is Grand Pré located?

Mr. PARKER: Grand Pré is located on Minas Basin in King's County, Nova Scotia, near Kentville and Wolfville in Nova Scotia. That is the land of Evangeline.

He also observed that, around 1820, there was a tendency to use some marsh areas almost exclusively for hay, but he could not find the reason for this shift.

In the second half of the nineteenth century, at least two conditions arose which might have encouraged the production of hay in these areas. The first was an expanding market for hay in the metropolitan areas of the eastern United States, where most of the transportation was by horse-drawn vehicles. The second was the development, after 1875, of the apple industry in Nova Scotia which made profitable the development of the frost-free upland areas. The introduction of apples into the cropping program on farms in this area resulted in less attention being paid to marshland husbandry.

The relative prosperity of the hay market was disturbed by the general re-organization of Maritime commerce which followed Confederation. Moreover, the development of motorized transportation reduced the demand for hay from the larger American cities and this market eventually disappeared almost completely.

These difficulties were aggravated by the adverse conditions which affected agriculture after World War I. The sharp downward trend in prices which followed the war seriously affected the cattle industry in the marshland areas and led to a considerable reduction in livestock numbers. Less attention was given to the proper use of the land and even the physical condition of the dikes was permitted to deteriorate. The direct influence of the agricultural depression was accentuated by some of the trends in the general economic situation. Labour, wages and opportunities for industrial employment resulted in a substantial migration of agricultural workers to manufacturing centres. Dike construction and maintenance was done largely by hand labour and an increasing scarcity of this type of labour raised the cost of this work considerably. This combination of unfavourable circumstances led to a deterioration of the protective works.

¹ John Young. *The Letters of Agricola*, Reprinted by Blackader Brothers, Halifax, N.S. 1922. p. 96.

Considerable areas which were once well protected have now gone back to the sea because of breaches in the dikes. Other areas require the immediate rebuilding and strengthening of the protective structures in order to prevent further breaches and losses to tide. Almost all of the present works require some degree of maintenance, in the near future, to ensure continued protection for the marshlands.

The concluding paragraph of the above quotation was with reference to the situation in 1950.

To the foregoing I should add that a joint program of emergency assistance involving the federal and provincial Governments, and owners of marshland, was carried out from 1945 to the commencement of operations under the Maritime Marshland Rehabilitation Act.

The publication just referred to also contains a section entitled "Background of Agricultural Development of the Marshlands of the Maritime Provinces" which I am sure you would find interesting.

The passing of the Maritime Marshland Rehabilitation Act, in 1948, permitted the Minister of Agriculture, on behalf of Canada, to enter into agreements with the provinces of Nova Scotia, New Brunswick and Prince Edward Island with respect to the reclamation and development of the marshlands in these provinces. Agreements were executed in 1949. The legislation and terms of the agreements define the divisions of work which were to be undertaken by Canada, and by the provinces. Briefly these are as follows:

Canada on request, subject to certain conditions, undertakes the construction and reconstruction of dikes, aboiteaux, and breakwaters, which are required to protect agricultural lands from salt water flooding. Canada also provides the necessary investigating and engineering services.

I might state, Mr. Chairman, for those honourable senators who are not acquainted with the term "aboiteaux", that it is a local term. An aboiteau is similar to a dam placed on a tidal stream, with dikes extending to each end of the aboiteau. This dam has a culvert through the bottom which at the downstream end, or the sea side, there is a control gate or a clapper gate, which is something like a door, so that when the tide comes against the door it closes against the jam and the tide cannot flow through the culvert. When the tide recedes the fresh water, which has backed up in the meantime, is able to flow out through the clapper or gate. I believe "aboiteau" really means a water control.

The Provinces undertake the construction and maintenance of drainage works on protected marshland, and arrange for the necessary rights-of-way and land required for the construction of the protective works. They also undertake the organization of marsh owners before any works are commenced, and promotion of sound land use programs.

The Act provides for the appointment of an Advisory Committee and states "no work shall be undertaken... unless (a) the work has been recommended by the Advisory Committee...".

To date the Committee has recommended no work be undertaken to protect 14 projects, and parts of 19 others. The Committee expressed the view the cost of structures to reclaim the areas did not appear to be warranted in the light of expected benefits. The provinces, after investigations were made, requested consideration of 10 others be discontinued. The 24 complete projects comprise approximately 7000 acres of marshland.

On commencement of operations under the Act in 1949 a headquarters was established at Amherst, N.S. and the most urgent work was undertaken on the first marshland areas organized. As many protective structures were in precarious states temporary repairs only could be carried out to continue protection of a degree to the areas. Standards of design and construction were

developed and I believe in the intervening period have been improved. It appeared the deterioration of many of the old structures could be largely attributed to lack of maintenance. An attempt was made to design and economically construct the new structures in order that they might be maintained, at a reasonable cost, using present day equipment and facilities.

To date the program has involved the construction or reconstruction of 236 miles of dike varying in height from one to ten feet; the placement of 59½ miles of special dike facing at exposed points to prevent deterioration by wave action; the construction of 362 aboiteaux of various sizes and the repair of 40 others. As a result of redesigning drainage systems the need for 694 other aboiteaux was eliminated. This, of course, will reduce the future maintenance required. 12.8 miles of bank protection were placed to prevent undercutting of dike bases. Dikes and rights-of-way have been seeded, and where sea water action has not been too severe a salt tolerant vegetative cover has been established on the sea side of the dikes. Work has not been completed on all projects undertaken to date but only relatively minor, finish or clean-up operations are required on a few projects.

Investigation indicated substantial savings in cost could be made, and there would also be other important advantages if larger structures were erected near the outlets of tidal streams. The principle was that the need for one or more aboiteaux, 65 in the case of the largest structure, and varying quantities of dike might be eliminated. On occasion it was found practical to enter into joint undertakings with other agencies, i.e. Provincial Departments of Highways and Public Works, and the Canadian National Railways, to repair or construct dual purpose aboiteaux, or causeways which would be to the advantage of all parties and would result in a considerable saving of public funds. In all there have been 23 combined undertakings and of these the most important are the Annapolis River, the Isgonish River and the Nappan River Dams in Nova Scotia, and the Tantramar River Dam in New Brunswick. Each serves as a highway crossing over the river and thus eliminates the need to replace highway bridges. The Annapolis River is the largest tidal river brought under flow control by M.M.R.A. and the dam is believed to be the largest of this type in the world when consideration is given to the range of tide.

Except for some early preliminary investigations the foregoing works have been planned, designed and constructed by staff of the Department. On request special studies have been undertaken, one being that just completed for the New Brunswick Department of Public Works on the feasibility of a causeway across the Petitcodiac river in the vicinity of Moncton, N.B.

The reclamation program was undertaken primarily as an aid to agriculture in certain areas of the Maritime Provinces. Incidental to this aid, but nevertheless of major importance, is that as marshland areas have been protected so have the interests of others, in that protection has been afforded to 30 miles of paved road grade, 42 miles of secondary road, several miles of market road, 44 miles of railroad grade, 2 railway stations, sections of 4 or more towns, radio transmission towers, graveyards and other property. It is believed that had not a government agency or other well organized group become involved in the reclamation work in these areas, most areas of marshland in Nova Scotia and New Brunswick would now be out-to-sea. Had this happened the resulting cost to highway departments, railroads, towns, etc. in providing essential protection to property could well have been in excess of all expenditures made by Canada in the current program, and, in addition to this there would have been the loss of this highly productive soil.

The cost to Canada for the construction and maintenance of the protective structures since the beginning of the program 12 years ago has been

about \$18,600,000 and included in this sum is the cost of all surveys, engineering, construction supervision, equipment, workshop operations and general administration.

I know you are interested in the production potential of the marshland soils and for this reason I recently obtained the following information from the Superintendent of the Experimental Farm at Nappan, N.S. I should state, Mr. Chairman, that in this following quotation reference is made to "dikeland". I have been referring to marshland, because that is the way the Act refers to it. "Dikeland" in this quotation has the same meaning as "marshland".

Soil Analyses:

Tests have shown that on upland soil those layers below plow depth contain diminishing amounts of available mineral elements, yet on the dikeland the converse is true. Analyses of soil samples taken at 6-inch to 30-inch depths show that these layers of dikeland soil average nine times higher in potash and seven times higher in available phosphorous than do equivalent layers of upland soil.

Natural Fertility of Dikeland Soils

Long-time trials on the Nappan Farm demonstrate the natural fertility of dikeland soils.

One area under test has been in a grain-hay rotation for the past 34 years and during this time has received no fertility treatment. Two and one-half tons of limestone per acre have been applied at six-yearly intervals. The average yield of hay for the first five years of this test was 2.3 tons per acre while for the last five it was 2.8 tons. Oats gave an average of 43 bushels per acre for the first three times they appeared in rotation and 45 bushels for the last three times.

In another long term test, the production of a permanent hay crop has held up over 35 years without any treatment. In the first five years the yield averaged 1.88 tons per acre while in the last five years it averaged 1.92 tons.

Relative Productivity of Upland and Dikeland

Long-time records maintained at the Experimental Farm at Nappan show an average yield of 40 bushels per acre of oats on upland and of 54 bushels per acre on dikeland under the same modest fertility program. Comparable figures for hay, an excellent dikeland crop, are 1.33 and 2.98 tons per acre.

Returns from the Use of Lime

Dikeland soils are extremely acid having an average pH of approximately 5.3 although readings lower than 4 are not unknown. Consequently the use of agricultural limestone gives excellent results. The following data are indicative of the returns that may be expected from the use of lime:

Treatment	Av. Yield/Acre		Av. Return/Acre \$
	Oats (9 yrs.) (bu.)	Hay (22 yrs.) (tons)	
No limestone	28.2	1.83	20.39
2½ tons/acre every 6 years	45.9	2.79	32.18
Average returns per ton of lime			\$ 28.30
Average return per dollar expended on lime costing \$2.00 per ton			\$ 14.15

Dikeland for Pasture

Dikeland has excellent potentialities as pasture. A trial, designed to compare upland and dikeland pasture under similar treatments applied on the surface was conducted at the Experimental Farm for five years. Yearling beef steers were used as grazing animals. When no lime or fertilizer was applied dikeland pasture produced 349 pounds of beef to the acre as compared with 222 pounds produced on adjacent upland. With an application of $\frac{1}{2}$ ton of lime and 200 pounds of superphosphate per acre annually the figure for dikeland has averaged 536 pounds per acre in comparison with 439 pounds on the upland.

Senator STAMBAUGH: You did not give us any cost of the superphosphate there, or is it at some other place?

Mr. PARKER: I mentioned the superphosphate earlier on. It is not mentioned in the table because in that case there was no superphosphate added.

Senator STAMBAUGH: You would have to have the cost in order to tell what the gain was.

The CHAIRMAN: Would you use superphosphate in this test? This test was done simply from the point of view of lime?

Mr. PARKER: I think that was in the previous one. In this case half a ton of lime and 200 pounds of superphosphate were applied to each acre annually.

The CHAIRMAN: That was a test on pasture land, and not oats and hay land?

Senator STAMBAUGH: Yes, but when it comes to the number of pounds of beef in order to be able to tell whether it was profitable or not you would have to have the cost of the superphosphate.

Mr. PARKER: The price is about \$50 per ton, so that 200 pounds would cost about \$5.

Other Crops: While oats and hay have been the crops most commonly grown on the dikeland soil at the Experimental Farm, others have been grown with excellent results.

Swede turnips, field corn, sunflowers and barley have produced yields as large as on upland with smaller applications of fertilizer on the dikeland.

A trial over a period of five years showed that carrots, beets, wax and green beans, garden peas, spinach, lettuce, radishes, sweet corn and potatoes can be grown on this soil. The quality was excellent and the yields higher than on upland, but crops such as carrots or potatoes would require washing before sale as a film of dark soil adheres to the roots or tubers. Maturity is slightly slower on dikeland, being some ten days later than on upland.

Other vegetable crops such as squash, cucumbers and tomatoes were not as successful, suffering greatly from the effect of wind, as the dikeland areas are open and unprotected. Squash were grown successfully when planted in the lee of field corn.

Mr. Chairman, in concluding this presentation I make the following comments and observations: The construction of works undertaken to date under the Maritime Marshland Rehabilitation Act has been the initial or first step in the general program of tidal marshland rehabilitation, and this phase of operations is nearing completion;

Some progress has been made by those groups and persons responsible for drainage and further development of the areas now protected. It can be stated that in some areas drainage and other developments have not proceeded at the rate first envisaged, whereas in other areas excellent progress has been made;

Perhaps one of the most important considerations in this day of encroachment on good agricultural land by urban and industrial development is that

had the current program, or one similar to it, not been undertaken it is quite probable most, if not all, the tidal marshland areas which were protected by dikes in 1949 would now be subject to frequent salt water flooding: as a consequence there would have been a loss, perhaps for decades to come, of some 70,000 to 80,000 acres of land which, when properly treated, can be the most productive in the Maritimes, and probably is among the more productive in Canada;

Well farmed areas produce excellent crops of timothy, clover and coarse grains. The potential for beef production is high—30,000 to 40,000 tons of meat are now imported annually to the Maritime Provinces;

The full benefit of reclaiming the tidal marshland areas can only be attained by a concentrated and organized attack on those general factors responsible for restricting so many Maritime farm operations to marginal and submarginal levels.

Mr. Chairman, that is the close of my formal presentation. There may be questions which I shall be pleased to answer.

The CHAIRMAN: Thank you very much, Mr. Parker. Yours was a very illuminating and easily understood brief. Have honourable senators any questions?

Senator GOLDING: Mr. Chairman, mention has been made in the brief about the cost up to date of these marshland projects, and after some number of years it has amounted to \$18,600,000. Do you think, Mr. Parker, that that has been a paying investment?

Mr. PARKER: Senator Golding, down deep I believe that it has.

Senator GOLDING: You think it has?

Mr. PARKER: This investment was made as a result, you will appreciate, of Government policy.

Senator GOLDING: Yes, I understand that.

Mr. PARKER: Well, down deep I believe that it has paid. I do not know how one can say that an acre of land is worth only so many dollars. I do not know what a group, whether it be private or whether it be Government, would say is the limit that they want to spend in protecting or saving land of this type. There must be a limit but what it is I do not know.

Senator GOLDING: What will be the cost of maintenance on all this investment?

Mr. PARKER: No one knows exactly. In round figures we would estimate that it would be approximately, and I am not now thinking of overhead and sinking funds, \$1 an acre. We have had no experience on which to base that estimate, however. Obviously the maintenance was done previously by hand, but we have estimated in round figures a maintenance cost of \$1 an acre.

Senator GOLDING: What I am trying to get at is what has been the return on this initial investment? In making such an estimate you are going to try to arrive at some figure of profit or benefits that have accrued from that investment, and you will also have to take into consideration all the time and expense, the cost of maintenance from year to year, which would probably increase in the future, could it not?

Mr. PARKER: It could, yes.

Senator BARBOUR: Do you know of the price at which good land has been sold or exchanged in these areas?

Mr. PARKER: It will vary from area to area. In the area around Amherst in Nova Scotia, the price must be very low. In areas in King's County I believe it would be fair to state that for the purpose of settling estates or filling out a block on a farm that it has gone for better than \$200 an acre. That, however, would not be overall.

Senator BARBOUR: That would be for land adjoining some farm, would it not?

Mr. PARKER: I would think so.

Senator McGRAND: In the course of your presentation, Mr. Parker, you say that there are 7,000 acres of marshland which have been reclaimed that were comprised in 24 complete projects. Were 7,000 acres reclaimed?

Mr. PARKER: No, Senator McGrand, there were 24 projects which comprised 7,000 acres, to which consideration was given to reclaiming but the committee said, "No."

Senator McGRAND: How many acres have been reclaimed?

Mr. PARKER: Approximately 80,000 acres.

Senator McGRAND: At a cost of \$18 million?

Mr. PARKER: Yes.

Senator McGRAND: Could you allocate that as between Nova Scotia and New Brunswick?

Mr. PARKER: In Nova Scotia 43,000 acres, and the cost of that work to date is \$8,065,000. That figure I have given you does not include services, engineering, construction equipment, administration and construction supervision. That is labour paid, contractors paid.

In New Brunswick 37,000 acres were reclaimed, at a cost of \$5,016,000.

Senator McGRAND: How is this cost shared as between the provinces and the federal Government, this cost of reclaiming and maintaining that land. The cost of maintenance must be high. Who pays for that maintenance?

Mr. PARKER: At the present time the responsibility for maintenance is with the federal Department of Agriculture. The act provides for that and this provision is included in the agreements with the provinces, that the provinces will take care of the maintenance of these projects at such time as the Minister of Agriculture designates.

Senator McGRAND: So all this cost is paid by the provincial treasury rather than by the individual farmer?

Mr. PARKER: Canada is holding the provinces responsible, and the provinces in turn have agreements with the marshland owners. At the present time, though, you understand, Canada is still carrying on with the maintenance.

Senator McGRAND: So at the moment nothing is being collected from marsh owners?

Mr. PARKER: That was the idea behind the agreement. Up to the present time the marsh owners have not been asked for any payments. I would point out that Canada has not yet turned over the maintenance to the provinces.

Senator McGRAND: Can you give us any idea of the increase in production in the way of grain and crops, the increase of capital, on land in these areas? We know that for a period of time the marshlands will be salt-soaked, and will remain so until such time as the salt is leached out of the land before becoming productive. Have you any idea as to what has been added to the crop production in this area resulting from the reclamation?

Mr. PARKER: Mr. Chairman, all of this land was not subject to saltwater flooding. Only some of it was. The larger percentage of it was protected by dikes which offered protection to a degree but they were not substantial and a series of high tides could cause the owners damage beyond repair. In other words there was no security. Drainage was poor and there was no encouragement to make any investment on the part of the owner. All of these areas

were not salt-soaked entirely. I cannot produce here now, and I doubt if anyone can at the moment, statistics to show an increase in any one particular area, but I do know that in the Tantramar area of New Brunswick, between Aulac and Sackville, the cattle population has increased significantly. It is recognized that Canada was in a position to make initial expenditures rapidly and carry out its responsibility. The marsh owners, on the other hand cannot come along as fast, it has to be a growing thing. As I mentioned, in some areas I believe efforts which have been put forward have not been successful, but in some other areas it has been excellent. I have not answered your question, Senator McGrand, with statistics, because I have not got them.

Senator McGRAND: Perhaps I could go into that question later on after Mr. Hill gives his presentation.

Mr. PARKER: May I just state that in the 2,640-acre block of marsh in Cumberland County, this was in the Minudie marsh, the dikes deteriorated and part of the area was being flooded. In 1957 the Nova Scotia Department of Agriculture started to bring this land back and put it into community pasture. I have some information on that if the committee would like to have it.

Senator McGRAND: We already have that information. It was given to us by the Minister of Agriculture of Nova Scotia.

Senator BARBOUR: On the marshland between Amherst and Sackville was there not a large amount of that land where hay was cut year after year successfully?

Mr. PARKER: Yes.

Senator BARBOUR: How large an acreage was it?

Mr. PARKER: There are 18,000 acres of marshland between Amherst and Sackville, north of the railroad track. That is largely a hay producing area. But along the Aulac Ridge, and north of Sackville, working east, there is a marked increase in the numbers of cattle each year.

Senator BARBOUR: You have not reclaimed very much land in Prince Edward Island.

Mr. PARKER: There is a single project on Prince Edward Island. The soil there is not the typical Bay of Fundy soil, and the interest in reclaiming that area has not been too pronounced in recent years. The late Senator Jones at the time he was premier was very much interested in that type of development in some areas of Prince Edward Island.

Senator BARBOUR: But they were not large areas in any case?

Mr. PARKER: No.

Senator McGRAND: The original diking in Nova Scotia goes back into history. It was done in the Grand Pré area by the Acadians, and it was all done by hand, of course. This was about the year 1720. Now, as to the marshland that was reclaimed around Minudie and towards Amherst, about what period was that done?

Mr. PARKER: I believe that was done around the year 1780.

Senator McGRAND: That would be after the expulsion of the Acadians and when the Yorkshiremen came out to settle in that area?

Mr. PARKER: About that time. I believe Mr. Hill's ancestors moved in the vicinity of Cobequid Bay. I should like to make one observation: I understand the first marshland area to be diked was at Port Royal in 1630 or 1634 when the early settlers came over from France. Apparently these settlers came from an area in France which was behind dikes and so conditions were not strange to them when they settled on these flooded areas. The upland areas were and still are very stony in that particular area.

The CHAIRMAN: Might I ask you, Mr. Parker, what acreage would be necessary for a farmer to have to obtain a reasonable living on that marshland?

Mr. PARKER: Well, I do not think marshland alone is adequate. It would require a combination of upland land and marshland.

The CHAIRMAN: Is it now so divided that way?

Mr. PARKER: Generally speaking, yes. Generally speaking a man has a farm in an upland area and within commuting distance or right next to his upland farm sometimes is marshland belonging to him. The loss on the marshland reduces the value of the upland farm. That is why I have said this is an integral part of an estimated 450,000 acres of farm land, and it supports—well, in Nova Scotia it is 10 per cent of the cultivated area of that province.

I am wondering, Mr. Chairman, if I could just firm up the figures of maintenance a little bit?

The CHAIRMAN: Yes.

Mr. PARKER: It is our belief that in New Brunswick the cost of maintaining the structures—that is, dikes and aboteaux—to protect the area there is 96 cents, or a dollar, per acre. That is maintenance only. In Nova Scotia I have a figure here of \$1.56. I was under on my overall figure of a dollar. That does not allow anything for a sinking fund, or supervision.

The CHAIRMAN: As this project develops is the farm population increasing or decreasing? Have you noted any marked difference there at all?

Mr. PARKER: No, I have not. This land is not changing hands in the way it, perhaps, should if it is going to be fully used. There are areas where the activity has not been too pronounced, and perhaps a change in ownership there, brought about by some means or other, would improve the use of this land.

Senator McGRAND: There are no homes built on that marshland? There are barns in which they store the hay harvest?

Mr. PARKER: Yes.

The CHAIRMAN: They are all on the upland.

Senator McGRAND: Nobody builds a home on the marshland?

Mr. PARKER: Only in the vicinity of the villages. It is not secure. They would not dare.

The CHAIRMAN: There is another question I would like to ask: Is there any silt running down the rivers now, and is that still being maintained and used?

Mr. PARKER: In the upper reaches of the bay and in these tributaries the silt is in suspension continuously. I am referring to this area of Moncton, Sackville, Truro, and to a lesser extent Grand Pré, and in the vicinity of Annapolis Royal there is practically no silt. The tide flows over the land, and as it turns, at slack water, the silt settles out, and that silt gradually builds up. That is the way these areas originated. At one time early in the nineteenth century, and perhaps, late in the nineteenth century, breaches were made in the dikes purposely to let that tide water flow over the land, the idea being that it served as somewhat of a fertilizer. That, of course, would be too expensive an operation today.

Senator BARBOUR: Do the fall tides do quite a lot of damage to the dikes?

Mr. PARKER: The tides which do damage to the dikes may be spring tides or fall tides. We have just gone through a cycle in 1958 and 1959 which gave us peak tides in an 18-year tide cycle. We have had fewer high tides this year than we had last year, or the year before, or the year before that. It is a combination of storm and high tide which makes for damage.

Senator BARBOUR: Storms with the high tides?

Mr. PARKER: That is correct, and we have tried to build the structures so that we can get at them following a storm so that they can be more easily maintained than in the past, and I hope we have been successful in doing that.

Senator INMAN: Have you any idea of the number of hay barns there are on those marshland areas?

Mr. PARKER: I would hate to hazard a guess, except to say there must be hundreds of them, but they are fewer now than they were ten or twenty years ago.

Senator INMAN: I remember about 18 years ago that there were about three thousand of them.

Mr. PARKER: I would not be surprised but I do not know.

Senator INMAN: I was wondering if they have decreased.

Mr. PARKER: Yes, they have decreased. Some of the properties were some distance from the farms, and they went out, made their hay and stored it in the barns, and then after that the hay was taken out and baled as markets occurred. As they baled it they hauled it to the railroad and sold it in that manner. Now with the loss of the markets for hay and the coming of mechanization more of that hay is going to the farm and is being fed to the cattle and there is less need for storage on the property itself.

The CHAIRMAN: Thank you very much, Mr. Parker. That was a very fine brief.

Honourable senators, we will now hear from Mr. Hill.

Mr. Ross Hill, Executive Director, Canadian Federation of Agriculture: Honourable senators, I am a third generation farmer on my own farm specializing in fluid milk production, with hogs as a sideline. My home is right here in the area of Truro. I present this brief in my capacity as executive director of the Canadian Federation of Agriculture representing the three Maritime provinces. You will find that I am a much different type of witness from the one I am following. Mr. Parker is an expert and is the director of this particular work about which he has reported to you. I will not attempt to give you figures or anything in detail like that, but I will talk to you in generalities, and on principles.

On behalf of the Maritime Federation of Agriculture I have been asked to place before you today some views dealing with land use in the Maritime region. I understand that on previous occasions, the opportunity was made available for similar presentations of views, and what I say to your Committee today, at least in part, may be a repetition of former statements.

The industry of Agriculture over the past few decades has been experiencing a great upheaval. Those of us engaged in the industry have found it necessary to adjust or combine the philosophy of farming as a way of life with a business enterprise. This adjustment demands a high degree of management ability, a knowledge of economic conditions, and an acceptance of social responsibility.

There was a time when most farms had plenty of manpower and the jobs of threshing, wood sawing, etc., would be done by several neighbours, with very little cash outlay. Today we have only the essential labour force. Machinery has been developed for every possible job—machinery which has brought about more efficient production and burdensome surpluses.

While the great industrial boom has brought expanded markets to us, and more efficient means of production it has not been possible for agriculture to maintain a labour force to compete with the wages of industry. This

is because farm income and prices have not been in balance with the cost of goods produced by industry, and which the farmer must have to produce efficiently.

Great strides have taken place in our educational systems, particularly in rural areas, and these improvements have become increasingly costly, and even more difficult to control. Farm lands have been taxed to pay a relatively higher percentage of the cost, compared with other taxable property. I believe if education costs increase much more, many more farmers will be forced to leave the land, unless some other method of financing education is devised.

Improved health standards through increased hospitalization systems, also are a drain on taxable farm lands.

These are mentioned, sir, not because I think they are unnecessary and undesirable, but because they loom before us as additional tax burdens on farm lands.

To meet these and other rising costs, over which it seems the farmer has little control, he must (1) Buy more land—result, more taxes; (2) increase production—result, greater surplusses; (3) become more efficient—result, greater surplusses.

Competitive production, processing, marketing, development of synthetic substitutes, ease of transportation, and refrigeration, etc. of food products, together with "big business" ethics, they all tend to narrow the margin of profit for the farmer today, and the local market, so-called, is rapidly disappearing. It therefore becomes necessary for farmers to be concerned with export and world markets.

The combination of these factors as outlined means that farmers must place themselves in position to control production and yet have sufficient to supply a market; they must co-operate within their own areas to set up supply and marketing agencies, either through co-operatives or marketing boards, and they must spend considerably more time and money to develop such organizations. In the field of farm policy, ideas must be initiated by farmers themselves and sparked through farm forum groups and action through farm organizations. Leaders in organizations must be developed through extensive use of adult educational measures. More research must be brought into the field of marketing and tariff structures, economic and social policies, as well as farm management. On the latter, much of the progress will have to be made by the farmers as individuals, and other means of progress will be brought about jointly on the part of farmers' organizations with assistance and support by municipal, provincial and federal governments.

While one may say the foregoing has little bearing on the subject of Land Use, I wish to point out that whatever a farmer produces comes from the land in some form, and therefore all of the social and economic changes through the years have been dependent on the manner in which our land resources have been managed. There is every reason to believe that even greater emphasis will be placed on land use and land values in the future, because of the evolution which has taken place in our industry.

We look forward to a very comprehensive program for rehabilitation of agricultural and forest lands, as well as people, under the ARDA legislation, and as we anticipate the worth of such legislation, we need to assess what we have in our Maritime area; how we shall proceed to conserve and develop both our lands and our people; and as well try to determine how such a program will be financed. As I see it, these are the main objectives of a Land Use program.

We have had in the Maritime region a well conducted Maritime Marshland Rehabilitation project for the past number of years, and potential productive land has been conserved through this means. This land will become more fully utilized as farmers develop the programs of production and marketing mentioned heretofore. It has been suggested on a number of occa-

sions that the M.M.R.A. should be extended to take care of land erosion in fresh water areas, and we still maintain this as a very essential requirement. Land drainage and land breaking programs, community pastures and soil fertility programs must be recognized as a responsibility of the state as well as the land owner, and if possible extended where necessary.

Our forest resources are probably our greatest potential asset in the Maritime region. The imperative need of "planning" to make better use and educate our people to handle this resource needs very little elaboration at this time. Research on utilization with the forestry industry itself is a must.

Further, we suggest an even greater and all embracing planning program for land and forest resources by means of Land-Use Research. Most of this country—and I am referring to our area—has been covered by a soil survey. What is needed now is that land-use surveys be superimposed on the soil surveys that have already been done. These area land-use surveys lend direction to the development of the best types of farming suited to each region within a province, and become an important feature of farm management, or on a broader scale management within the industry which involves the use of land.

Expropriation of cultivated or productive land for building highways, power lines and such, is of concern to those within our industry. In the past there has been very little planning by authorities who have been charged with the responsibility of developing these assets for our whole community. In some instances, valuable farm land and properties have been expropriated, with little thought in mind of conserving valuable land, and in a great many cases the farmer has not been fairly compensated for this land.

In all these programs extensive planning will require the greatest wisdom we can produce, and large expenditures will be necessary. It must be kept in mind that in the past, too great a burden was placed on land to maintain our social and economic progress. In planning for the future it will be necessary to make people in other walks of life understand that existing circumstances will necessitate the lifting of this burden at least partially, if not entirely. Municipal and provincial governments in the Maritime provinces may have to rely on federal financial assistance to a very large degree to bring about the required changes, and to place this region on an equitable basis economically with other more favored sections of Canada. Land is often referred to as the nation's bank account—we must not allow it to become depleted or robbed of its ability to produce.

The CHAIRMAN: Thank you very much, Mr. Hill. Your brief is very enlightening.

Do honourable senators wish to direct any questions to Mr. Hill?

Senator McGRAND: Mr. Chairman, I would like to clear up a question I asked Mr. Parker, on where he says in his brief, "The 24 complete projects comprise approximately 7,000 acres of marshland". I must say I do not get the importance of that statement.

Mr. PARKER: What I was pointing out, Mr. Chairman, was that the provinces asked for areas to be reclaimed. These areas were considered by an advisory committee and the advisory committee turned down any suggestion for the development of these areas.

Senator McGRAND: And the total acreage amounted to 7,000 acres?

Mr. PARKER: 14 projects plus 10 which the province decided not to pursue, amounted to 7,000 acres. If they had been approved and reclaimed the total acreage would amount to 87,000 acres instead of 80,000.

Senator McGRAND: Out of that 80,000 acres which have been reclaimed, approximately how many acres of that are now in production of some sort or other, production that adds to the economy? I thought of that marshland as being simply part of the sea and of no use at all.

Mr. PARKER: May I be permitted to make an estimation?

Senator McGRAND: Yes, of course.

Mr. PARKER: Over 95 per cent of it would be capable of producing something.

Senator McGRAND: But how much of it is being utilized now? How many acres are now in production?

Mr. PARKER: I do not wish to appear evasive, Mr. Chairman, but 95 per cent of it is being used to some extent. The lowest 25 per cent is not too good, the top 25 the best. I am thinking of areas in and around Yarmouth, which are now protected from the tide but where the drainage works have not been put in and therefore the lands are not fully used, although out of perhaps one hundred acres, ten or fifteen were cut last year and this year there may be 50 acres cut. It is not good quality hay.

Senator McGRAND: Have you any idea of the increase in cattle production in the county of Westmorland within the last few years? This information ought to be available from the chairman of the board of assessors for the county of Westmorland. That is in New Brunswick in the area in which most of the reclaimed land lies.

Mr. PARKER: I have not got a figure for that, I am sorry.

Senator McGRAND: I am under the impression that there they were going to go into beef production, and if anything is to be done in that line I think that is the place where it will be done, I am wondering how much impetus has been given to the beef industry at the present time.

Mr. PARKER: I should know that, of course, but I wonder if Mr. Grant of the Maritime Co-operative Services could give an estimate of the increase in the last ten years. I am sorry, Mr. Chairman, I do not have that information myself.

The CHAIRMAN: Mr. Grant, have you any idea what that would be?

Mr. Roy Grant, Secretary of the Maritime Federation of Agriculture, Moncton, New Brunswick: Mr. Chairman, I do not think that I have that information either, but it is evident to one living in that area that there is a very substantial increase. I have had occasion to live and work on a farm located on dikeland for a number of years in Hants county, and I can well remember it was a very important part of our farm operation, and I can remember at one time a high tide caused a breach in the dike and our whole farming program was upset for a year and a half. I know that the cost of this has been very material, but the thing I am getting at is that it has increased the ability of those farmers to develop and maintain long-term programs. In many instances their whole program was disrupted as a result of these high tides breaking through the dikes and ruining the work of a lifetime. It is hard to put a value on these things, Mr. Chairman.

Senator McGRAND: I think it is general knowledge that there has been an increase in the number of cattle in New Brunswick and that the cattle population there is increasing. I would like to know in what counties this increase is found. That would be a good way to estimate the figure I am trying to arrive at.

Mr. PARKER: Mr. Chairman, may I undertake to get that information and forward it to the committee as soon as possible. I will do what I can to get it. We are interested in Westmorland county and in Albert county, and the Cumberland county should be a good area although I do not believe it is.

Senator McGRAND: At the time you are getting that information will you also get information as to the number of cattle on that permanent pasture in Albert county? We have no permanent pasture in New Brunswick and it is in Albert county.

Mr. PARKER: On that community pasture, you mean?

Senator McGRAND: Yes. How many acres are there in it and how many cattle are on it? Another question I would like to ask is this: Some few years ago, possibly 25 years ago, attempts were made to bring western cattle east in the summer and turn them on to pasture in New Brunswick. Some of that activity was undertaken in Albert county on those marshlands. Has that movement prospered? Are there more, or less, cattle being brought in for finishing today on those marshlands?

Mr. PARKER: Would you have that information, Mr. Grant?

Mr. GRANT: Mr. Chairman, I would say from general observations that there are still some western cattle coming in, but the long freight haul and high freight charges limit that. There are certainly more feeder cattle being produced and as time goes on there will be, in my opinion, a material increased use made of these marshlands. I was hoping our young people would be producing more cattle. I think we have the best facilities to do it. We have in the Maritimes, moisture, natural grass and pasture, which are important in this activity.

The CHAIRMAN: Have you had any experiences with western cattle being raised on these marshlands? I would think that the cattle themselves would have to be acclimated before they actually developed into cattle weighing so many pounds of beef. Feeding on marshland is much ranker than it is on the prairies.

Mr. PARKER: The steers used on the Nappan experimental farm have been western steers. They have been the ones that showed a marked increase in gains. This is done in less than a five-month period.

The CHAIRMAN: That is very good work.

Mr. PARKER: The grazing season on marshland is short. If you get 150 days you will be doing very well. Minudie pasture, for instance, lasts from the first of June to the month of October.

Senator BARBOUR: I guess that there are figures on all that. They weigh the cattle when they go on the pasture and when they leave.

Senator McGRAND: We got those figures from the Minister of Agriculture of Nova Scotia. We just wonder what we have in New Brunswick on permanent pasture.

Mr. PARKER: The pasture in New Brunswick is not administered in the same manner. Theirs is a different policy. It is a local community effort and they are not improving the pasture to the same degree, but it is coming along.

Senator BARBOUR: Mr. Chairman, in Mr. Hill's brief reference was made to the high taxes for educational purposes levied on farm land. May I point out that in Prince Edward Island we have no tax on farm land.

Mr. HILL: Mr. Chairman, I would just like to say that that is a difficult place I find myself in, trying to represent the Federation of Agriculture of three provinces, and naturally I spoke with more knowledge of the conditions in New Brunswick.

Senator BARBOUR: Some years ago we had a government in Prince Edward Island that wanted to do a lot for the farmers and they removed the tax from farm land. A year or so ago we had another election and the government of the day was very kind and they removed the supplement. The districts used to pay supplements, so now the farmers pay a tax on their automobile, but not on horses or machinery. That is the way they get along in Prince Edward Island.

Mr. HILL: Mr. Chairman, I would like to remark that is one of the most serious problems in New Brunswick and no doubt will lead to difficulties in hiring teachers and developing rural education programs. Criticism is often made of municipal councils not voting the necessary money.

Senator GOLDING: Well, that is not the only place where it is a serious problem. It is a serious problem pretty well across the whole country.

The CHAIRMAN: You mentioned forestry as being one of the coming ideas in the Maritimes. Have you figured out just how a farmer will be able to seed his land down to forset and maintain a living at the same time. Forestry, as you know, is a long-term proposition.

Mr. HILL: Just before attempting to answer your question, Mr. Chairman, I had a note on the side of my brief on that point. I did want to comment on the fact that I thought this committee had done very valuable work toward the bringing forth of this new Arda legislation and I think it should be complimented on the contributions that it has made. In February, along with two or three other members of our organization in New Brunswick, we met with the assistant to the Minister of Agriculture and they talked to us about this Arda legislation and about what the minister hoped could be done in the years ahead as far as forestry is concerned and it seemed to me his idea was that farmers on submarginal soils will be encouraged to plant trees and cultivate them and there would be some method of giving them income until such time as he could develop his forest to secure income from it later on. That to me is a factor which decides whether this will make it a success or not. I suggest that in many of our areas we have farmers who get some income from farming and probably more income from the forest. I may say that the average farmer has not been educated to look after his forest nearly as well as he has been educated to look after his farmland. I think that a lot of this farmland is expected to be planted in forest and some of the cleared fields also, fields which will never produce good crops. These fields could be planted with Christmas trees, for instance, and thus make better use of this land. I think there is hope in it.

The CHAIRMAN: I was just wondering if you had worked out the idea of how a man could earn a living in the meantime?

Mr. HILL: That, Mr. Chairman, is a \$64 question.

The CHAIRMAN: Has the committee any further questions to ask of Mr. Hill?

On behalf of the committee I would like to thank you all for coming down here and giving us these very fine briefs this morning. We have gained much information on this marshland development scheme.

The committee adjourned.

THE SENATE

SPECIAL COMMITTEE ON LAND USE IN CANADA

EVIDENCE

OTTAWA, Thursday, April 27, 1961.

The Special Committee on Land Use in Canada met this day at 11 a.m.
Senator Arthur M. Pearson in the Chair.

The CHAIRMAN: Honourable senators, we have a quorum now, and I think we should get started right away. We have with us this morning Dr. C. C. Spence, Economics Division, Canadian Department of Agriculture, Edmonton, Alberta. He will read the brief, which has been prepared by the three gentlemen who are here, namely, Dr. C. C. Spence, Dr. G. C. Russell, Experimental Station, Lethbridge, Alberta, and Dr. J. C. Wilcox, Research Station, Summerland, B.C. These are practical men in the field of water conservation and irrigation, etcetera, and I hope senators will have a number of stiff questions to ask them when the brief has been read. Dr. Spence would you first give us a background of yourself before you start?

Dr. C. C. Spence, Economics Division, Canadian Department of Agriculture, Edmonton, Alberta: Mr. Chairman, honourable senators, and visitors, I do not think I can claim to be an authority on irrigation, although during the past 25 years I have been in fairly close contact with the development of irrigation in western Canada. Our own economics division during that 25 years has conducted a number of economic surveys in irrigation in western Canada and I have taken a part to some extent in these surveys. They have been in association with the P.F.R.A. activities in the west. A few years ago I had the opportunity of spending 15 months in one of the Middle East countries as land use advisor to an irrigation team of the Food and Agricultural Organization, which gave me an opportunity to study from the outside the irrigation of countries such as ours. In those ancient dry lands, such as Iran, in particular, irrigation is a must, and people have to irrigate in order to live. However, I have with me two of my colleagues from the west, Dr. Wilcox, of the Research Station, Summerland, B.C., and Dr. Russell, of the Experimental Station, Lethbridge, Alberta. They are irrigation specialists, have a broad knowledge of irrigation and have had wide training, and although I am going to read the brief, which is somewhat general, they are here to take up the story and to clarify anything which in my diction you have misunderstood and also to discuss other points of irrigation which may come up in the course of our deliberations.

I would like to point out first that having studied the deliberations of your committee on Land Use, I feel that your achievements have certainly reached the highest expectation we thought possible in the organization of your committee.

I will now commence to read my brief entitled "Irrigation in Canada and its impact on Agriculture".

Extent of Irrigation

Canada as a whole

In Canada, irrigation facilities are provided for scarcely more than one per cent of the 100 millions of improved land. Probably not more than three fourths of one per cent or 750,000 acres are regularly irrigated with a goodly part receiving not more than one irrigation a year.

For the most part irrigation in Canada is distributed in the southern part of the three western provinces; Saskatchewan, Alberta and British Columbia, roughly in the proportion 1:10:2. It had its beginning during the early part of the present century in the production of fodder for cattle, and this is still its most wide spread promising profitable use. Other important uses of irrigation in Western Canada are in the production of tree fruits and canning crops in B.C.; sugar beets and canning crops in Alberta; and vegetables including potatoes in all three provinces. Scattered throughout the irrigated acreage in all the provinces is the production of spring grains which with fallow today accounts for more than half of the irrigated acreage.

In Eastern Canada irrigation is practised on many market gardens and in fields of flue cured tobacco. The high value of such crops warrants irrigation even in the more generally higher natural precipitation areas. However, the acreage in irrigation is relatively small compared to the irrigation in Western Canada.

Extent in three western provinces

Saskatchewan has the least acreage under irrigation, possibly not more than 50 thousand. Most of it lies in the Missouri drainage basin in the south western part of the province along the Frenchman river valley. In Alberta facilities for irrigating 850 thousand acres stretch across the southern part of the province from the foothills of the Rockies almost to the Saskatchewan border. This is all within the Saskatchewan river basin from which the water is diverted in many places for irrigating. While not all utilized, facilities have been built in British Columbia for irrigating around 150 thousand acres. These are generally in the valleys of the interior flanking the Fraser, Columbia and the lake channels through the Okanagan as well as in the East Kootenays.

Most important irrigated crops

Respecting important irrigated products in Canada, about one-fourth of the tree fruits are grown under irrigation in B.C., and forty per cent of the beet sugar is produced under irrigation in Alberta. While available statistics do not permit as close an estimate of the contribution of irrigation to cattle and sheep production, it would appear that approximately one-fifth of that marketed in Alberta comes from the irrigated land and the adjacent dryland complementary to it in cattle and sheep production. While figures are not available, it is observed that irrigation is becoming of increasing importance in the growing of flue cured tobacco in Ontario.

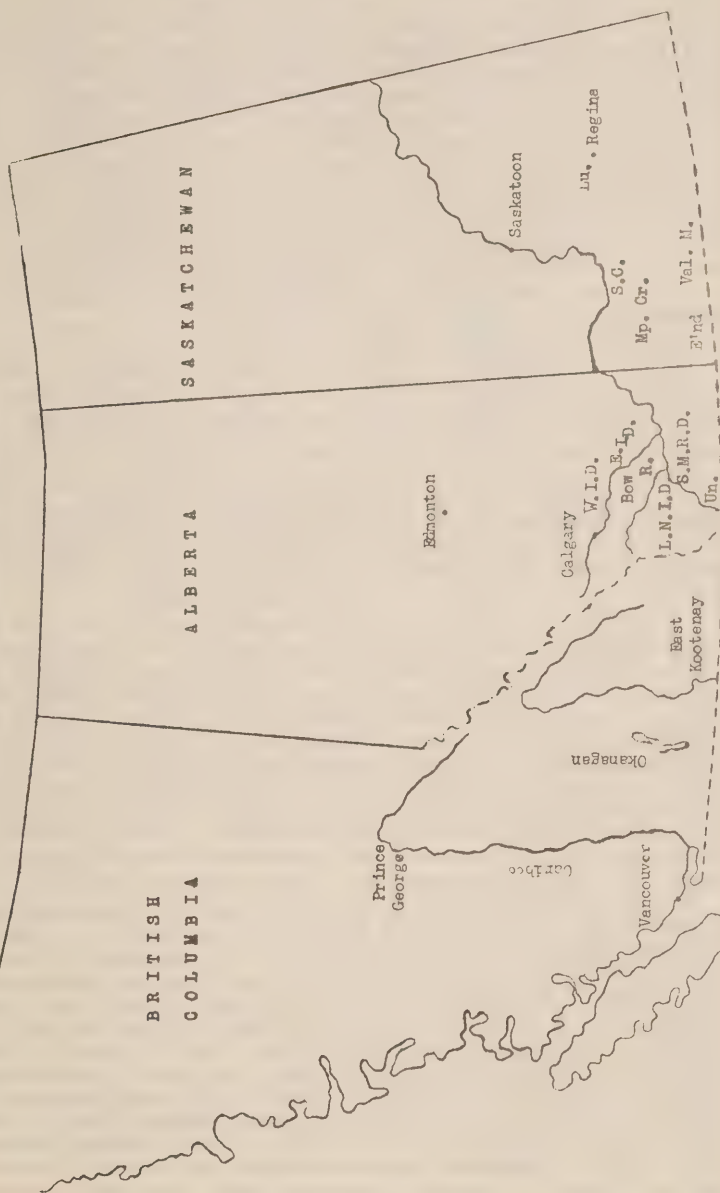
Location of Irrigation and Development History

Saskatchewan

With the exception of scattered flood irrigated hay meadows of the ranchers there was little irrigation development in southern Saskatchewan before the advent of the P.F.R.A. in 1935. Since then practically all the development in the Missouri river basin, and most of the smaller individual projects elsewhere has been done under the P.F.R.A. During the past decade the Saskatchewan Department of Agriculture has been developing irrigation as well. The irrigated tracts are used mainly in forage production and the land is fairly well distributed among adjacent dry land farmers who are in varying stages of organizing water user associations to operate and maintain their own irrigation systems.

I should like now to refer to the map which follows page 5 of the brief. It is a map showing irrigation in British Columbia, Alberta and Saskatchewan.

MAP SHOWING IRRIGATION IN
BRITISH COLUMBIA, ALBERTA AND SASKATCHEWAN.



Alberta

In Alberta, by far, the large irrigated acreage is organized into a dozen water user associations. They are commonly referred to as irrigation districts. Most of them are organized and operate under the province's Irrigation District Act. The Western and the Eastern Irrigation districts centre approximately 30 and 130 miles east of Calgary. The latter comprising about 170,000 irrigated acres is largest. St. Mary and Milk River Development (S.M.R.D.) the next largest district, including three other more or less independently operated districts, the Magrath, Raymond and Taber, lies south and east of Lethbridge. The Lethbridge Northern lies north of Lethbridge. To the east of the Lethbridge Northern and south of the Eastern lies the Dominion Government Bow River project formerly the Canada Land and Irrigation District. Two other districts lying west of Lethbridge, namely the United and the Mountain View, should be noted. All of these were established from 30 to 50 years ago.

When I say "established," I should perhaps point out they commenced operations then, as far as irrigation is concerned.

Irrigation development began in Alberta shortly after the turn of the century in the early years of settlement. At first it was done on a small scale by ranchers, in order to ensure feed supplies, and later, on a large scale by railway and other developing agencies to colonize extensive land holdings. A combination of conditions favoured this early development. There were sources of water in streams flowing from the mountains at the west. The greatest flow occurred during the growing season on the open plains. Diversions could be made from them by comparatively simple structures. The distance to the plains was relatively short. The southern plains sloped to the east and provided a gravity flow. The fertile soil and the long days of sunshine with moisture were conducive to a rapid growth. Natural precipitation was generally scant and irrigation could augment the supply.

Nearly three-fifths of the present irrigated lands in southern Alberta were developed and colonized by the Canadian Pacific Railway. Most of such land had been acquired by means of crown grants given to assist in railway building. The land would return far more revenue to the railway company from crop production than from grazing, not only because of the produce which could be carried to distant markets but also because of the number of people who could be supported there to be served by the railway with both in and out traffic. Most of the other two-fifths of the irrigated land has been developed by other corporate organization, community effort and latterly crown corporation of which both the Province of Alberta and the Dominion have been active. This activity has been associated with rehabilitation since the drouth of the thirties. I am speaking, of course, of the larger irrigation projects in Alberta.

The course of irrigation development has been both accelerated and retarded according to circumstances. Furthermore, any appraisal of this course must be considered from both long-term and short-term points of view. From a short-term point of view it is possible that, apart from the need of providing a supplementary feed-supply for the cattle rancher, irrigation was introduced too early in the growth of the agricultural economy of the Western Provinces. When this development was taking place there was still more land open for settlement to the north and east where there was a more dependable natural precipitation, and other conditions in respect to soil, topography and market outlet were as favourable as where the land was irrigated. Thus the irrigation farmer with his higher costs had to compete with the dry land farmer. This continues to be the situation for at least three-fourths of the acreage under irrigation today. It is a case of having to obtain much higher yields than the dry land farmer obtains. For the remaining fourth of the irrigated land, which lies a little to the south and east, factories have been established for

processing sugar beet and canning crops. These factories enable the farmers to grow crops of high value per acre which return a higher net revenue than do cereals.

In the beginning it was planned that the farmers who settled on the irrigated land would pay the cost of the operation of the irrigation systems, and over a period of years would repay the original investment. Contracts to settlers were issued accordingly. Almost from the beginning, however, settlers defaulted in their payments, and even with relief to the extent of having the price of the land reduced from around \$60 per irrigated acre to a quarter of that amount, they still continued to fall into arrears in their assessed payments for operating expenses and on capital account. Those districts which were developed by community effort were the first to get into financial difficulties and their affairs were taken over by the Alberta Government which had guaranteed the irrigation districts' bonds. The provincial government has continued to direct their financial affairs to the present time.

Both the Western and the Eastern irrigation systems were developed and operated for several years by the C.P.R. which subsequently handed them over to the water users. Likewise did the C.P.R. develop and operate the A.R. & I., the original of the S.M.R.D., and handed the system over to a newly formed Alberta crown corporation which is now extending the system. In 1949 the other corporation developed system, namely the Canada Land and Irrigation District, was taken over by the Dominion Government through the P.F.R.A.

Thus, for more than two decades following the initial development, irrigation farming on the southwest plains could not be acclaimed a financial success. Nor was it successful in other respects for many settlers abandoned their irrigation farms, some to move into other employment and others into dry land farming to the north and east.

Then there came a succession of drouth years—1929 to 1937 inclusive—over the whole south central and western plains when irrigation farming looked more attractive. There was then an exodus of dry land farmers on the southern plains, and many found their way to the irrigated areas. The abandoned irrigated farms were rapidly reoccupied and a cry arose for the extension of irrigation to lands beyond the range of existing irrigation facilities. During this drouth period these irrigated lands proved a valuable source of relief fodder. Thousands of tons were shipped east even to points beyond Regina. Since then there has been a gradual increase in the acreage irrigated by approximately 100,000 acres with construction under way for an additional 50,000 acres.

British Columbia

Over in B.C. there are four times as many water users associations licensed for irrigation purposes as in Alberta but the largest at Vernon comprises 8,000 acres as compared to the Eastern Irrigation district in Alberta as noted of 170,000 irrigated acres. Most of these B.C. irrigation districts are located in the Okanagan valley and valleys in southeastern B.C. They comprise in all over 50,000 irrigated acres. It is estimated that nearly twice this or 100,000 acres are irrigated by community and individual effort, in varying degrees of irrigation utilization, most of this being hay and grain land of cattle ranches. This is scattered throughout the whole southern intermountain dry region with possibly the greatest concentration in the Cariboo and Kamloops country extending southward from Quesnel. Irrigation in the Okanagan began in the early part of the century with the beginning of fruit growing on a commercial scale. A few ranchers divided suitable land into ten to twenty acre patches and planted apple trees thereon and brought in water from nearby streams to irrigate. The potentials in fruit growing were soon recognized and there followed, land speculation, a rush of people into the valley, and rapid development. Fruit cannot be grown in those southern dry interior areas without irrigation.

Irrigation districts have been a concern of the B.C. government since 1918, when most of the older systems got into disrepair and no funds had been accumulated by the users to rehabilitate them. The story of their periodic near bankruptcy and rescue by the province need not be retold here except to point out that their financial experience in the capital cost and early operating activity was the usual with most irrigation districts which has been described previously. Thus today it is recognized that any sizeable irrigation development can go forward only with considerable financial assistance from the state even to the extent of providing the capital outlay in the storage reservoirs, diversion and main canal works.

Factors to Consider in Irrigation Development:

Irrigation experience in Canada suggests that the factors to consider in irrigation development might be grouped under seven headings, namely: (1) water supply (2) engineering (3) soil and other physical characteristics of the land (4) efficiency in use of water (5) climate (6) markets (7) human reaction. We find the seventh heading "Human Reaction" is the most important at the present time.

Water supply

The Saskatchewan River is by far the greatest potential source of water for irrigation on the dry plains of Alberta and Saskatchewan. Of the three quarters of a million acres of land being irrigated today possibly 700,000 acres are provided with water from the south branch and its tributaries. It is estimated that enough water could be drawn from this same source to irrigate nearly three times the existing irrigated acreage, or about two million acres more, before conflicting too drastically with other needs. But even this would irrigate only about 5 per cent of the improved land in the brown and dark-brown soil belts of Alberta and Saskatchewan.

The quality of the water too, so provided from the mountains, is relatively free from harmful salts which is very important in plant and animal life. While, as noted, the peak of the flow out of the mountains occurs in June and July coinciding with the need of irrigating on the prairie, irrigation development has already been extended to a point where no longer will the simple diversions supply adequate water. Storage must be provided. However, this is engineeringly feasible at relatively low costs. It is estimated that to meet the needs of the S.M.R.D. system of 400,000 potential irrigable acres the two reservoirs on the St. Mary and Waterton rivers will cost less than 30 million. The South Saskatchewan River dam and storage works to provide for irrigating about the same acreage in Central Saskatchewan is estimated to cost about 100 million. This will provide as well power energy, down stream water control and municipal water supply.

Engineering

Further in respect to engineering the land slopes to the east thus providing a gravity flow eastward and in general, the topography is level requiring few conduits other than can be constructed in the dirt canals and the occasional low cost flumes. While in these respects in the intermountain regions of B.C. there is a contrast, the source of water is not far from the irrigation tracts and comparatively short spans of canalling from adjacent semi-natural storage is all that is necessary.

Soil

Soil and other land characteristics are the next problem listed. Most soils will respond favourably to plant growth with the application of water. Heavy

textured soils require much less water than light textured. Some become water logged more so than others and require artificial drainage. Likewise some contain a larger content of undesirable salts which may affect plant growth under irrigation if not carefully handled. But there are few problems which cannot be overcome, by careful husbandry, and this is the same in levelling the land to provide for more even and economical application of the water.

Efficiency in use of water

The distribution of water results in some losses, and as water becomes more limiting such losses will become more critical. Losses occur by evaporation from both reservoirs and canals and by seepage from canal and laterals. Some of these losses are unavoidable but much can be avoided in the structure and layout of the system.

When the water reaches the individual farm, economy in its application relates to sufficient but not excessive quantity for maximum yield commensurate with the cost. This in turn depends upon the kind of crop, the features of the land, the method of irrigating and the character of the soil.

Climate

Climate is an important factor. In the southern Okanagan of British Columbia the annual precipitation is less than 9 inches making this area definitely submarginal for crop production. Irrigation is a necessity here and with the relatively longer frost free period such high value crops as tree fruits can be grown to warrant full use of irrigation. In the prairie provinces, the annual precipitation varies from less than 13 inches in the central southern interior to more than 20 inches in its eastern and western borders. Though a goodly part of this annual precipitation occurs in the early summer months, at 13 inches it is on the margin for successful crop production and it is in these areas where there occurs periodic crop failures and early drying up of pasture lands.

Within that latitude, too, there are higher valued per acre crops which can be successfully grown such as sugar beets, potatoes, and certain canning crops—peas, beans, corn and cucumbers—being the more common under irrigation but the limiting factor is markets.

Markets

In respect to markets possibly the sugar beet enterprise is illustrative of the situation in regard to producing high value per acre crops under irrigation in Western Canada. The first step in the marketing of the farmers' beets is the processing into sugar. Factories must be strategically located. There are three in southern Alberta. One in the Lethbridge Northern I.D. at Picture Butte, and two in the S.M.R.D. at Raymond and Taber. All are owned and operated by the Canadian Sugar Industries. The company contracts with some 1,500 growers within these two irrigation systems for 35-40 thousand acres of beets, the limitation of this being placed by the share of the beet sugar in the domestic market. About one-fifth of Canada's sugar consumption is from beets, the balance from imported cane. The two irrigated systems in southern Alberta produce $\frac{2}{3}$ of the beets in Canada—roughly $\frac{2}{3}$ of $\frac{1}{5}$ or 8% of sugar consumption in Canada. This is about equivalent to the population of Alberta where Alberta beet sugar enjoys a comparative advantage due to transportation costs. This processing and marketing is fairly indicative of the other so called specialty crops. Potato acreage has a wide distribution throughout the irrigation districts because no special facilities are required for the non-processed product. There is a wider market also since considerable amounts of Alberta potatoes from irrigated districts are marketed outside the province in B.C. and Saskatchewan. An even wider market is anticipated in the movement of late of the potato producers into the processing field.

As noted fruit cannot be grown successfully in much of the Okanagan on account of the climate, without irrigation. Nor can it be grown without a market, and this there is in the prairie provinces lying adjacent to the east where the climate discourages any attempt at commercial fruit growing.

Markets then are one of the most important factors in determining the pattern of agricultural production in the irrigation district. This explains too in a large measure why nearly four fifths of the irrigated land is in the same kind of production as is carried on over the larger acreage in dry farming.

Human attitude

But there is the problem in Western Canada of human attitude toward irrigation which has been listed as the seventh major consideration. One might advance rightfully that this problem, can be explained in the other factors listed in the foregoing, particularly the markets. However, irrigation involves considerable hand labour. The amount of this depends on the design of the system, lay of the land, condition of the soil, kind of irrigation, flow of the water, crop irrigated and other conditions. Even with the most favourable of all conditions much spade handling and mucking around in the mud cannot be avoided. With a sprinkling system the spade work is eliminated but there is much work involved in the periodic moving of pipes from one location to another. While irrigation is on, one has to be on the job all his daylight working hours and a goodly part of the night.

Although the response of plant growth to such careful husbandry as afforded through irrigating gives one considerable satisfaction, it must yield a sustained profit to be indulged in. This can be obtained with irrigation where high valued crops can be successfully grown, but not always so with crops which can be successfully grown on dry land elsewhere in the west with which one must compete. Thus in the evolution of today's irrigation farming, it is only in the drier core, the eastern part of irrigated areas, where irrigation is consistently practised. At the western side in the C.P.R. developed Western Irrigation district facilities were constructed for irrigating over 200,000 acres; from 1951-58 an average of only 3,600 acres per annum was irrigated. Again during the same eight year period the average annually irrigated in the United Irrigation district, located on the western fringe, was about 9,000 acres out of a plant with facilities for irrigating nearly 34,000 acres.

Irrigation conscious people

The situation differs markedly in the Eastern Irrigation district which, as noted, is today the largest of the irrigation districts. The experience here is the most encouraging to be witnessed anywhere to point the way to successful irrigation farming on our western prairies within the present and foreseeable economy. As noted, this district experienced the same financial disaster, abandoning and hardship of the early days, as did the other districts. Since the C.P.R. handed it over to the water users in 1935 the acreage under irrigation has increased from seventy thousand to one hundred and seventy thousand and the capital reserves from 300 thousand (given the users by the company to take the system off their hands), to over a million. Two reasons largely account for this. The first is the fact that the district is well within the dry core and the farmers have learned they must irrigate if they are to reap, and the second is the large acreage of grazing land near at hand, so that the type of farming is largely a mixed cattle-sheep-forage-grain economy, with a scattering of the higher valued vegetable crops.

Referring further to the United Irrigation district, it should be noted too that this district was organized, constructed and occupied chiefly by the Mormons, an irrigation conscious people from irrigated sections of Utah and

Idaho. But they are located too far from the sugar beet processing plant at Raymond to produce beets and consequently are engaged in growing the usual dry land crops.

Beets and canning crops

Also settled by Mormon people was Magrath and Raymond, at the western end of the S.M.R.D. system nearby a sugar beet processing plant, where almost like conditions in respect to climate and soils prevail as with the United. As a consequence irrigation is largely confined to the acreage which is devoted to beets and canning crops. It was the perseverance of these people at Magrath, Raymond and elsewhere in the Lethbridge region which established beet growing in this area. As noted, today three beet factories operate in southern Alberta. There are also three relatively large canning factories in the S.M.R.D. However, subsequently the greatest concentration of the acreage in beets and canning crops has moved somewhat eastward in the vicinity of Taber where conditions in respect to both climate and soil have proved more satisfactory in their production. Such specialized crops act as cleaning crops within a rotation of cereals and forage and their by-products particularly the beet pulp and molasses, are a good feed. Their association with cattle and sheep feeding enterprise is readily seen. All of which lends itself to a type of farming which in turn encourages a different attitude toward irrigation than farmers who have few alternatives beyond the dry cereal-summer fallow rotation. The latter type too, requiring large fields and big mechanical equipment, has proved more attractive and possibly more profitable to our usual western farmer—for land in the west is cheaper than labour.

Development of more irrigated land questioned

There are those who question the expansion of irrigation in Western Canada at the present time, for dryland production appears to be adequate for our needs and even for creating surpluses, but we have been passing through a cycle of better than average natural precipitation. The situation may be different if we were to pass into a dry cycle such as occurred in the thirties. Irrigated tracts so strategically located as they are in Western Canada within the most drouth vulnerable parts of our country will be needed, particularly for forage to alleviate a situation which could create forced liquidation of valuable herds. Moreover, in building irrigation systems we are laying the foundation for food production in the future when Canada's needs will be much greater. Hence public investment in irrigation development would seem to be justified.

Where and What is Potential Irrigable Land

From the irrigation experience in Canada as related, it is obvious that any estimates as to the acreage which should be developed in irrigation and its location in the future could be very far off without careful and co-ordinating studies of water supply, engineering, efficiency in use of water, land, climate, markets and even human attitude. It is estimated that there are 15 million acres of land within the dry core of southwestern Saskatchewan and southern Alberta. As noted, there is barely enough water to irrigate 3 million. This land lies within the south Saskatchewan River and Missouri basins, and while the diversion of water and canalling in some instances may be costly such is not insurmountable. The latter is determined not only on distances to reach the irrigable acreage but on the topography and slope both in the areas to reach the tract to be irrigated and the tract itself. Then there are other characteristics of the land. The heavier textured soils—the clays and clay loams make up a considerable part of these 15 million acres. While with

careful husbandry practically all soils respond to irrigation, with heavier textured soils there is a far less margin between their production in irrigation and dry land use. In fact, in years of better than average precipitation irrigation may be detrimental. Then there is the depth of the soil and the presence of harmful salts and other characteristics which determine the physical irrigability of land.

Excluding the higher altitude of the Cypress hills and surrounding area no definite pattern regarding degree of aridity has been established within the 15 million acre core. It is noticeable that there are differences but such may be explained in the difference of the soil and the possibility in the lay of the land in respect to the incidence of hot dry westerly winds. There are significant differences in temperature, too, and in the length of growing season in relation to latitude of which cognizance must be taken, and this is especially important in the production of tender species of specialized crops.

Then there is the strategic importance of markets. An outlet for those products for which irrigation farming has a distinct relative advantage is essential. There are the so called specialty products. At the present time, this appears to be definitely restricted; particularly with the bulky products. With the processed, there are possibly more outlets in more distant places. Only a modest expansion in irrigated land, however, can be predicted commensurate with the growth of the country's population.

It is estimated that all the water available from the South Saskatchewan and that which can be diverted from the North Saskatchewan River for irrigation would irrigate roughly 3 million acres. These are by far the most important sources for the dry open plains. As noted, facilities have been constructed to irrigate nearly 850,000 acres from this source. When present construction under way is completed and with other water commitments the potential water supply of this source will be barely adequate for 2 million more acres of new irrigable land. The considerations as to what should be irrigated are many and complex and will require much study and planning if the best use is to be made of this water and the complementary resources, land, capital and human effort.

The CHAIRMAN: Thank you very much, Dr. Spence. You have presented us a well thought out brief.

If honourable senators have any questions to ask we have three gentlemen here who will be very glad to help us out.

Senator HORNER: Mr. Chairman, while someone is thinking up a question may I be permitted to go ahead and make a very few remarks. The great value of irrigation, as I see it, is its use in emergencies. It is fodder for livestock, and as our livestock population is increasing irrigation has and is contributing to its development, and the irrigation of these lands is necessary. However, I think we should immediately enter into a policy of providing a year's fodder in advance because any year could turn out to be a dry one, and if that happened, and no water was available there would be nothing but loss through disposing of livestock at sacrifice prices. I think there is a great need to advocate a year's supply of fodder. The provision of irrigation should be a two-year business, that is we should always be prepared with a reserve for next year. In fact, many irrigation companies have adopted that policy but far too many have merely sufficient for the season between the snows.

The CHAIRMAN: What you are advocating, Senator Horner, is a fodder bank?

Senator HORNER: Yes, a fodder bank. Of course there is nothing new about that at all. I never consider that we have a surplus of grain, we merely have a year's supply; there are so many things, particularly a drough year, that could cut down the grain crop, and then there is also the possibility of hail,

grasshopper plagues. I may say, Mr. Chairman, that I know the district described by Dr. Spence; I spent some time there over 45 years ago. I know of the various difficulties they had to meet, and one of the difficulties, as was mentioned, is the alkalai or salt soil.

I would like to ask Dr. Spence now while I think of it if the method of the flooding is inferior to spraying? Have you any views on whether the sprinkler system can be worked economically, particularly where lands are not suited to saturation?

Dr. SPENCE: Mr. Chairman, I think Dr. Wilcox will deal with that, if you will agree.

The CHAIRMAN: Yes, we will glad to hear Dr. Wilcox.

Dr. J. C. Wilcox, Research Station, Summerland, British Columbia: Mr. Chairman and gentlemen, I cannot answer that with a definite yes or no because it depends on the particular circumstances. In British Columbia we are using a great deal of sprinkler irrigation. We are also using a great deal more furrow irrigation than sprinklers at the present time. It depends on the particular circumstances as to which we would recommend. On our sloping hills and sandy soils we recommend sprinkler irrigation. Where water is becoming very scarce and very expensive to deliver we recommend sprinkler irrigation. About 75 per cent of the fruit growers are now using sprinklers. In the range area they are using more furrow and flood irrigation because the crop is not such a high-priced crop that they are growing. I think in making a recommendation we have to consider the value of the crop, the price of the water, the scarcity of the water and the value of the crop. Where we are growing tree fruits, market gardening or forage crops we can afford sprinkler irrigation and we get better crops and profits with that system. But in some cases we cannot do that.

Senator HORNER: In later years the use of aluminum pipe and fittings has become popular. These make the work of sprinkler lighter and easier to move. Is that a factor in irrigation at all?

Dr. WILCOX: That is the only thing that is allowing us to use the sprinkler system. In British Columbia we were using sprinklers in the 1920's but we had old-fashioned heavy type equipment, too heavy to move. But with the use of aluminum piping and new types of sprinklers and couplers the laying of lines is made much cheaper and more feasible, and we may still make improvements yet.

Senator McGRAND: Just roughly what is the percentage of plairie lands, of western lands that require to be irrigated? Is there water available in the west to irrigate all the land that needs irrigation?

Dr. SPENCE: No. Water is a limiting factor.

Senator HORNER: The seasons vary so much that some years great sections would do without irrigation, and other years they would need it. The amount of moisture makes it very difficult to say definitely.

Senator TAYLOR (*Westmorland*): In other words, some years there is a sort of crop insurance?

Senator HORNER: Well, it could be, but for growing grain on a large scale it is not feasible.

Senator TAYLOR (*Westmorland*): I want to ask a question on that. In the second paragraph of your brief you say:

"It had its beginning during the early part of the present century in the production of fodder for cattle, and this is still its most widespread promising profitable use."

I have heard many discussions on this, and people from the east, particularly, refer to the fact. As a matter of fact I saw some of these irrigation areas when I was out there. They could not understand how it could be possible to irrigate land for production of livestock. They thought it was feasible for the production of expensive crops, such as market gardening crops and things of that nature, but for the general production of livestock, for grazing, they doubted very much the advisability of that. Why not move the herds into an area that does not need irrigation and concentrate the areas which need irrigation on producing expensive crops? That was the answer they made to this problem.

Dr. SPENCE: That means the depopulating of herds on our finest grazing land. It has been proved you cannot move those herds into parts of the northern area in times of drought; it is not a feasible practice.

Senator BARBOUR: In your brief you say: "Both the western and the eastern irrigation systems were developed and operated for several years by the C.P.R., who subsequently handed them over to the water users,"

Did they hand them over without any recompense?

Dr. SPENCE: In the eastern irrigation district it was handed over lock, stock and barrel, with a bonus of \$300,000 to be sure the trustees of the organization would take care of the existing contracts, and also to help them rebuild the system.

Senator HORNER: The C.P.R. spent large sums of money and established a demonstration farm to encourage people to come in, and there was a great tract of country they were running the road through. By spending money and putting in expensive facilities they expected to bring a lot of settlers in, and in that way to make business for the railroad; it cost so much money. I suppose the C.P.R. was no doubt doing it as a business proposition, and they were trying to get a rental per acre that would re-pay them in part for their work on canals and roads over immense distances. As the doctor pointed out, when the land was vacant to the north and farmers were getting on dry farming they pulled away. They said they could get land cheap, and so why pay the cost. So, irrigation was neglected. In some cases it was a question of the difficulty of flooding of land which was unsuitable to flooding because it brought the salts out, which they did not suspect in the first place.

Senator BARBOUR: Would you say the C.P.R. was glad to get rid of it?

Dr. SPENCE: I do not think there is any question about that. They got it off their hands. Since that time the district operation has been re-organized, and the farmers have been thrown on their own initiative. They have cut down the overhead by almost one-third. This occurred at a time when prices were rising just prior to and during the second war years.

Senator GOLDING: I suppose you have some estimate of the number of acres they would be able to irrigate with the new dam?

Dr. SPENCE: With the new St. Mary's and Waterton dams, and also with the diversion of the intervening river, they estimate a potential of 470,000 acres.

Senator HORNER: Are you referring to the Saskatchewan River dam?

Senator GOLDING: Yes.

Senator HORNER: He is referring to the Saskatchewan River dam.

Dr. SPENCE: Originally, according to the blueprint, it was supposed to be 450,000 acres. According to the agreement the Saskatchewan Government has obligated itself to have 450,000 ready when the dam is completed.

Senator McGRAND: That includes what?

Dr. SPENCE: Those 450,000 acres are possible from the design of the storage structure.

Senator McGRAND: I think 168,000 acres was the choicest land available.

Senator TAYLOR (*Westmorland*): I think to irrigate more than that it would be much more expensive.

The CHAIRMAN: Have they made a survey of the soil in Saskatchewan, to see whether the salt will come to the surface?

Dr. SPENCE: During the last two years they got a program under way to study the soil in relation to salt. Dr. Russell can speak to that.

Dr. RUSSELL: Mr. Chairman and gentlemen, I do not think I can add any more to what you have already said. They are making such a survey, and I think this 168,000 acres is going to be an optimistic estimate of the best land suitable for irrigation. They will get the 50,000 easily, but how much beyond that it is difficult to say.

Senator HORNER: Is it not true too that the dry-land farmers have been occupying this land, and perhaps this will result in a new type of farmer coming in? For instance, there is a great difference between the farmer who wants to use water to irrigate the farm and the fellow who wishes to dry-land farm. I understand that even in Saskatchewan some of the fellows who are perhaps losing one crop in three through drought do not want this. In that case you can say: "All right; we will sell it to some fellow who wants an irrigated farm". These other farmers say: "We do not understand that type of farming". It will probably work out that people from Europe or somewhere else eventually will make wonderful use of that land, but our old dry land farmers are not particularly interested in cutting down their acreage and giving an irrigated crop the continual watching care that it needs.

Senator GOLDING: That seems to be the opinion expressed in an article I read in the *Country Guide*.

Senator HORNER: Yes.

The CHAIRMAN: Have the large irrigation projects such as you have in Alberta had any effect on the weather, or the amount of moisture from rain obtained in the areas outside.

Senator HORNER: We were told at one time that lakes drew water.

Dr. SPENCE: I do not think there is any scientific evidence to support that idea. The same thing has been said of trees, but I do not think it has ever been proved scientifically that trees bring water. Trees come from water.

Senator HORNER: Yes, if you have no water you will have no trees.

Senator TAYLOR (*Westmorland*): I wonder if there has been any scientific determination made of rainfall in relation to the topography of the area? I am thinking of New Brunswick where in the Saint John River Valley it is very hilly, and in that area you have far more thunder storms and showers than are encountered out in the country. I was wondering if there has been any scientific investigation as to why this is?

Dr. RUSSELL: I was going to say that I come from the Prairies, and we do not have these hills.

Senator TAYLOR (*Westmorland*): You have them in Alberta.

Dr. RUSSELL: We get plenty of thunder storms, but I do not think they have any particular relationship to the lay of the land.

The CHAIRMAN: I think there is a difference in climate between certain areas in the heat of the year. If you are driving along in the summertime through a large area of summerfallow you find a very hot air blowing off it, but when you get into an area of bush you find the air is quite a bit cooler. Does that cause any more moisture to be in the air, or is it just the effect of the sun's not striking the soil?

Dr. SPENCE: You would have to have a meteorologist to tell you about that, but I have observed the same thing. In driving to my home I have to go through bush among hills, and, whether it is a psychological effect or not, I find those hills are always cool.

Senator HORNER: It is a strange thing, but the premium for hail insurance in Saskatchewan, for instance, varies from four per cent to 15 per cent. There are certain areas which the insurance companies will not touch unless they obtain double the rate at which they give insurance in other areas. I do not know why that is, but land formation must have something to do with it.

Dr. SPENCE: There is a difference in the foothills of the mountains. The higher elevation creates a difference in the incidence of hail, and other weather conditions. We experience that all along the western foothills country of Alberta, which is subject to more moisture.

Senator HORNER: I have two pieces of land which are two and a half miles apart, and I pay four per cent hail insurance on one parcel of land, and six per cent on the other.

Dr. RUSSELL: There are certainly bands in southern Alberta which we refer to as hail areas, and there are other areas which are more moist than the rest of the surrounding country. Part of this is due to the air currents through the mountain passes, but that is about the only influence or factor that we have been able to determine.

The CHAIRMAN: You have not determined any effect from the irrigation?

Dr. RUSSELL: The effect of the irrigation districts—there is definitely more moisture in the atmosphere which comes from those crops that are growing there, but there has not been any detectible difference for any distance outside of those areas, although undoubtedly they do have some effect.

The CHAIRMAN: Senator Smith, have you anything to say about the fruit in British Columbia?

Senator SMITH (*Kamloops*): I am wondering, Mr. Chairman, if for the record we should have these gentlemen correct what I think is a commonly mistaken idea that the expansion of irrigation programs is just increasing the competition with respect to surpluses. Those close to this program know that that is certainly not entirely right because the use of irrigated land has become an integrated program as between dry farming and irrigation farming. Is not that right? There is no longer a straight irrigation farm program or a straight dry farm program. There was a day when this movement from the drought areas into the irrigation areas was very pronounced, and when it was said: "These fellows will not make a success of it because they are not irrigation farmers". It was considered at that time that there was a definite difference between dry farmers and irrigation farmers, but today farming has become an integrated program.

Dr. RUSSELL: I think in the past it was the experience that it took a generation to develop an irrigation farmer, but I do not think it is going that long in the present day because, as you have pointed out, the most successful irrigation districts are those that are worked in conjunction with the dry land areas surrounding them, where there is feed production for the animals on the irrigated land, and range for the animals on the dry land which is in association with the irrigated district. It is definitely a co-ordinated effort now in many of the areas. That would not be true, of course, of some of the areas in British Columbia, or some of the vegetable growing areas of Alberta, but it would be true of the areas which are not surrounded by large tracts of irrigated land, or where there is more dry land in association with the irrigated land.

The CHAIRMAN: You mentioned something about tobacco irrigation. Is that used extensively yet?

Dr. SPENCE: I understand it is certainly increasing in southwestern Ontario. They are using old creeks which used to be a liability to the farmer but which are now becoming an asset. In cases such as that where there is an intensive crop and a costly crop, which uses much labour and fertilizer and so on, you cannot afford not to have irrigation.

Senator SMITH (*Kamloops*): The same applies to the hop crops.

Dr. SPENCE: Yes, and to the fruit as well in the Okanagan Valley. In those areas the farmers cannot afford to be without water if it is at all possible to get.

Senator GOLDING: What do you estimate the approximate cost for sprinkling per acre would be for, say, sugar beets, or anything of that nature?

Dr. RUSSELL: That is a figure which would vary but, to have a sprinkler system to adequately irrigate an area not just for sugar beets but for other crops in association with sugar beets—the economists might correct me—I think we use a figure between \$150 and \$200 an acre.

Senator GOLDING: It would not be the same everywhere but if you had an average it would give us a better idea of the situation.

Senator TAYLOR (*Westmorland*): You don't mean that is what it costs per year?

Dr. RUSSELL: No, that is the capital cost and then you would have your operating costs each year.

Senator GOLDING: Have you anything as to the average cost per year after the irrigation system has been installed?

Dr. RUSSELL: No, I have no such figure.

Mr. WILCOX: I can answer for British Columbia conditions, which do not apply to the Prairies. We have these rolling contours and sandy soils and clay soils in British Columbia and it is expensive to install a system there, but we did a survey with the help of Dr. Spence's staff in 1951 and we found that the average annual cost of a sprinkler irrigation system, using a pump to get pressure, was \$30 an acre. It would cost the farmer up to \$40 an acre but \$30 on an average. That is pretty expensive. Without a pump and motor and getting pressure through gravity and the use of pipes, it was \$22 an acre. Taking a comparable system of furrow irrigation with good flumes, and so on, the average annual cost was also \$30 an acre. The cost would be lower under Prairie conditions.

The CHAIRMAN: Is a good part of the cost due to labour?

Mr. WILCOX: In the case of furrow irrigation quite a high percentage of the cost is due to labour, but in the case of sprinkler irrigation it is not too high.

Senator TAYLOR (*Westmorland*): There is one point that still bothers me. Based on the initial capital investment per acreage, together with the annual operating cost, how could you profitably raise livestock on this land? It is hard to understand. I can appreciate that in the case of sugar beets or tobacco crops the amount of income per year per acre would be profitable, but it is difficult to see how it would be profitable in the case of raising livestock.

Mr. WILCOX: It is not for grazing but for winter feed only.

Dr. SPENCE: You complement it with your grazing.

The CHAIRMAN: It is anticipated in Saskatchewan that the farmer will grow fodder on this irrigated land and all of it will be saleable to farmers in dry areas who will buy it to keep their herds intact. In other words, the farmers in the dry areas will run short of feed and depend on the farmers in the irrigated areas for their feed.

Senator TAYLOR (*Westmorland*): What will happen in the case of the South Saskatchewan River Dam and storage works to provide for irrigation?

Will that area continue to produce the same crops or will it go into a different type of production?

Dr. SPENCE: I think the hope there is, there will be a change in the type of farm production.

Senator McGRAND: When you speak of fodder as storage you are referring to dry feed, are you not, and not to green feed?

Dr. SPENCE: Dried cured feed. They are experimenting with grazing on irrigated pastures.

Senator GOLDING: Have you any estimate of the average profit per acre in growing sugar beets in Alberta? I know the profit changes from year to year, and so on, but have you any estimate of the annual average profit to be made?

Dr. RUSSELL: Based on the estimated cost of producing sugar beets, the average net income would be between \$60 and \$100 per acre. The average yield for sugar beets in southern Alberta is just below 13 tons, and we estimate that to pay all costs, including taxes, and so on, it will take nine tons, leaving roughly four tons. Depending on the price, it would be four times that figure. The good farmer will produce over 20 tons to the acre.

Senator BARBOUR: I would not think it is a very profitable outlook. It would be better in British Columbia, but I would not think it would be very profitable in Saskatchewan or Alberta.

The CHAIRMAN: I think Saskatchewan is figuring entirely on fodder.

Senator BARBOUR: If you had to sell fodder from that irrigated land in a normal crop year you would get a very ordinary price for it, and I cannot see that it would be profitable at all.

Dr. RUSSELL: With respect to irrigated pasture production there is from 800 to 1,200 pounds of gain per acre according to various experiments which have been carried out, and this is definitely profitable.

Senator TAYLOR (*Westmorland*): Do you say from 800 to 1,200 pounds gain per acre per livestock?

Dr. RUSSELL: Yes.

Mr. WILCOX: In British Columbia we get anywhere from 15 to 17 inches of precipitation annually, and in those areas that have very dry summers they can increase production very largely with irrigation. A lot of dairy farmers in the north Okanagan are now using sprinkler irrigation. You would not think it possible but with a limited water supply they are able to double their livestock herd in many cases, and they have no rains to support them. It is just irrigated agriculture.

The CHAIRMAN: Do they import their feed or raise it themselves?

Mr. WILCOX: They import grain from the Prairies, or screenings or something of that nature, but that is only as a supplement.

The CHAIRMAN: Mr. Stutt, have you any questions to ask?

Mr. STUTT: Mr. Chairman, in the last paragraph of the brief, dealing with diversion of water from the North Saskatchewan River, it is mentioned that the potential water supply will be barely adequate for 2 million more acres of new irrigable land. I was questioning whether you were taking into account any estimates of increased demand for water for domestic and industrial use.

Dr. SPENCE: I think that is allowed for in the estimate. How much new storage is allowed for in the mountains and inland, I do not know.

The CHAIRMAN: We have Dr. Booth with us. Have you any comments to make, Dr. Booth.

Dr. BOOTH: No, I do not believe I have, Mr. Chairman; thank you very much.

Dr. SPENCE: Perhaps I should say to Senator McGrand that I think perhaps he is taking a short term view. I think in irrigation one has to take a long term view. It has taken some 40 or 50 years to develop to the present stage, and what will happen in another 40 or 50 years we do not know, but of course we hope to have more people in the country than now. In the meantime, we must have experience and development. Even if there is a financial loss in this respect, I do not feel that it is money wasted.

Senator BARBOUR: I would say that we are bound to have better markets in the future.

Senator TAYLOR (*Westmorland*): On the farm I had, as far as grain was concerned, I could not get more than one crop of grain in four years principally due to the lateness of the spring and not being able to get on the land, and also because of early frosts. In our part of the country we have so many weeks to get a crop in, and if we do not get it in we do not get a crop at all. It is quite different from other parts of Canada. I found that by underdraining a certain section of my farm it was a guarantee that I could get a crop every year, and therefore it was a type of insurance, just as irrigation is a type of insurance. In the production of cranberries, if you do not provide flooding, you will not get production; it costs a lot of money, but it is insurance against loss. I think irrigation can be classified in the same way as can under-drainage. Some years it will not pay, and in other years it will pay, but at least you get a crop. However, I still come back to the fact that your crop must be a pretty high income crop per acre to pay for it.

The CHAIRMAN: If there are no further questions, a vote of thanks for the presentation of this brief would be in order.

Senator GOLDING: I so move.

The committee adjourned.



Fourth Session—Twenty-fourth Parliament
1960-61

THE SENATE OF CANADA

PROCEEDINGS OF

THE SPECIAL COMMITTEE OF THE SENATE

ON

LAND USE IN CANADA

No. 9

WEDNESDAY, MAY 3, 1961

THURSDAY, MAY 4, 1961

The Honourable Arthur M. Pearson, Chairman
The Honourable Henri C. Bois, Deputy Chairman

WITNESSES:

Professor W. B. Baker, Director, Center for Community Studies,
University of Saskatchewan.

Professor H. Van Vliet, Department of Farm Management, University
of Saskatchewan.

APPENDICES:

Descriptive Statement of the Center for Community Studies.
Comparative Statistics for Canadian Agricultural Regions, etc.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Higgins	Power
Basha	Horner	Smith (<i>Kamloops</i>)
Bois	Inman	Stambaugh
Boucher	Leger	Taylor, (<i>Norfolk</i>)
Bradette	Leonard	Taylor (<i>Westmorland</i>)
Buchanan	MacDonald	Turgeon
Cameron	McDonald	Vaillancourt
Crerar	McGrand	Wall
Emerson	Méthot	White—31.
Gladstone	Molson	
Golding	Pearson	

(Quorum 5)

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

"The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Bois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—

Resolved in the affirmative."

J. F. MacNEILL,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

WEDNESDAY, May 3rd, 1961.

Pursuant to adjournment and notice the Special Committee of the Senate on Land Use in Canada met this day at 11.00 A.M.

Present: The Honourable Senators: Pearson, *Chairman*; Bois, *Deputy Chairman*; Barbour, Basha, Boucher, Cameron, Golding, Horner, Inman, MacDonald, McGrand, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*) and Turgeon. 16.

In attendance: Mr. Ralph A. Stutt, Special Consultant to the Committee; and the Official Reporters of the Senate.

Professor W. B. Baker, Director, Center for Community Studies, University of Saskatchewan, Saskatoon, Saskatchewan, presented a brief, was heard and questioned.

At 12.30 P.M. the Committee adjourned until tomorrow, Thursday, May 4th, 1961, at 11.00 A.M.

THURSDAY, May 4th, 1961.

At 11.00 A.M. the Committee resumed.

Present: The Honourable Senators: Pearson, *Chairman*; Bois, *Deputy Chairman*; Barbour, Basha, Boucher, Gladstone, Golding, Horner, Inman, McGrand, Smith (*Kamloops*), Taylor (*Norfolk*) Taylor (*Westmorland*) and Turgeon. 14.

In attendance: Dr. J. F. Booth, Canada Department of Agriculture; and the Official Reporters of the Senate.

Professor H. Van Vliet, Department of Farm Management, University of Saskatchewan, Saskatoon, Saskatchewan, was heard and questioned.

At 12.30 P.M. the Committee adjourned to the call of the Chairman.

Attest.

James D. MacDonald,
Clerk of the Committee.

THE SENATE

SPECIAL COMMITTEE ON LAND USE IN CANADA

EVIDENCE

OTTAWA, Wednesday, May 3, 1961.

The Special Committee on Land Use in Canada met this day at 11 a.m. Senator ARTHUR M. PEARSON in the Chair.

The CHAIRMAN: Honourable senators, we have with us this morning Professor Baker of the University of Saskatchewan. He is actually the director of the Center for Community Studies and not engaged in teaching at the university at the present time.

Professor Baker, will you give us a rundown of your background so that the members of the committee will be familiar with your career?

Professor W. B. BAKER, Director, Center for Community Studies, University of Saskatchewan: Mr. Chairman, I was born on a farm in a small mixed farming community in Saskatchewan. I enrolled in the School of Agriculture at the University of Saskatchewan and took a diploma course. Later I attended the College of Agriculture, doing undergraduate work in farm management. I was then appointed director of the School of Agriculture of the University of Saskatchewan and off and on spent three years studying sociology and social psychology at the Universities of Michigan, Minnesota and Kentucky. In 1952 I was appointed chairman of the royal commission on agriculture and rural life and I spent four years carrying on that study.

In 1956 I went to Australia and India on the invitation of the Carnegie Foundation looking particularly at community development programs in New South Wales and in India in general. In 1957 I was appointed director of the Center for Community Studies, which position I now hold.

The CHAIRMAN: You have had a very interesting career, Professor Baker.

Prof. BAKER: Yes, Mr. Chairman, I found it very interesting.

Honourable senators, I am very glad indeed to have the opportunity to be with you this morning and to talk to you a bit about Saskatchewan communities, and, if I might do so, on the basis of two documents, one which I will read, the other being a brief descriptive statement of the Center for Community Studies which I thought you might be interested in reading. It is a supplementary document which describes in great detail the work of the Center for Community Studies because so much of what I have to say grows out of the work we have done in the center for the last two or three years.

(See Appendix—"Descriptive Statement on the Center for Community Studies." Page 252.)

Mr. Chairman, my brief is entitled "Saskatchewan Communities as a Development Resource: Adjustments, Problems and Opportunities".

Communities have been described as the "housekeepers" of the nation. Membership in a community can be considered a universal phenomenon. Such membership performs a crucial purpose in linking persons to the broader

political life of region, province and nation. In various parts of the world, the community is a recognized mediating unit in the search for economic development, social stability and political order. The emphasis on mediating here is mediation between the individual and the larger organizations of society such as Government or volunteer organizations. Despite all this, communities as complex organizations are little understood. This can be demonstrated by careful reading of the reports of the Senate Land Use Committee. Time and again, reference is made to the importance of communities in rural resource development. They do have an indispensable contribution to make, but rarely is the character of the community subjected to critical review and analysis.

I appreciate your invitation to present some observations on communities as contributors to resource development. My approach will be to first make brief comment on what I shall mean by the term "community". This will be followed by a review of community adaptations to rural modernization. Some of the current problems of adaptation will be examined. Finally, a few general observations will be made on opportunities to increase the potential contribution of communities to rural resource development.

In preparing this presentation, I have drawn on the four years of study of the Saskatchewan Royal Commission on Agriculture and Rural Life. The fourteen-volume report of this study covers a wide range of social and economic adjustments having direct impact on communities. This has been supplemented by three years of experience and study through the Saskatchewan Center for Community Studies. This technical unit was established in 1957 for the purpose of conducting research, disseminating information, and providing advice on community change and development. Its professional staff of fifteen includes such disciplines as sociology, economics, anthropology, social psychology and extension education. Nine community-related research projects are now under way or in preparation, and you will find these projects listed in the brief memorandum that describes the center, which has already been distributed to you.

Short courses for extension workers and voluntary leaders are held under various sponsorships throughout the year. Specialized advice on community-development problems is offered on request.

My comments will be based on Saskatchewan studies and experience. There can be little doubt that the Saskatchewan experience can be extended to the Prairie region. Indeed, personal observation and the reports of others suggest that, with considerable variation in time and place, rural communities throughout Canada are caught up in a common transformation, and I have had an opportunity to examine this situation firsthand in each of the provinces of Canada except Newfoundland, and I think this statement of communities being caught up in a transformation is applicable to all.

The Meaning of Community

I will not take the time of your Committee to outline the various definitions of "community" produced by rural sociologists since the first studies in the early part of this century. Most people accept the fact that people live in specific localities identified by a name. These localities contain institutions—schools, churches, local government—and voluntary organizations. They are usually clustered around a trading center which dispenses a varied range of services. The central idea of community is that it provides an arena for collectively responding to life conditions in a particular land area.¹

¹ Albert J. Reiss, *A Review and Evaluation of Research on Community*, Nashville, Tennessee, 1954.

Mr. Chairman, I can give you some visual picture of what I am talking about from this chart before you. It indicates five Saskatchewan community centers of varying size and varying conditions ranging all the way from very small communities of about 100 population to the larger communities that may range anywhere up to 1,500 to 1,600 in population. When one talks about a community today we are having to talk about a very small unit area of about five or six miles in diameter, perhaps. What is now emerging, though, is a larger unit which is based on this smaller type of unit and which may be 25 miles in diameter rather than five. Might I suggest whether you are talking about the Prairie Provinces or Prince Edward Island you will be amazed at how frequently the farmers' primary community tends to be three to five miles in diameter, and there are very special reasons for this, as I will indicate later on.

The frequency with which these "collective responses to life conditions" took place in pioneer Saskatchewan is illustrated by the existence of an estimated 1,500 trade-centered communities. On the average, these clusters of activity occur every seven to eight miles along the railroad line. They range in size from the tiny hamlet with less than 100 residents to the larger cities of Regina and Saskatoon. Depending upon the size of the community trade center, you will find anywhere from a dozen to hundreds of different kinds of services, institutions and voluntary associations.

For our purposes, it is important to note that no two communities are ever exactly the same. This is another way of saying that each community has its own peculiar set of life conditions. They also develop their own peculiar way of collectively responding to those life conditions. This is illustrated by the widely observed fact that community decline is not just a matter of economics. Some Saskatchewan communities with obvious economic advantages appear stagnant. Other smaller communities of obvious economic disadvantage seem highly responsive to changing conditions. These are differences requiring explanation if rural development programs are to have general application.

Before leaving this simplified definition of what I will mean by community—that is, a place in which people share common problems and work at solving them—a word of caution is necessary. It is no longer possible in Saskatchewan, or in the prairie provinces, to think of single isolated communities. Most farm families now belong to a series of interconnected communities. Actually, what seems to be emerging is a sort of inverted metropolitan community. Certain towns are growing at the expense of others.

Perhaps I might go back to this chart again, and mention certain towns. In this instance Wynard is growing at the expense of Kandahar, Mozart, Elfos, Dafoe and Jansen. I call these new farm cities. This is a term that originated in some regional studies in the great plains of the United States. They have linked up, in some instances, as many as 20 centers. The town of Humboldt is a study we have made. It includes 18 satellite centers, only six of which are growing, and they are located like this, indicating that the farmer city has always about it a cluster of smaller satellite centers. Thus, instead of having people move from the urban "downtown" area to the suburbs—as in the case of metropolitan Toronto and metropolitan Montreal—in the prairie provinces we are having the reverse movement, where farm families are changing their trade and shifting from the small town suburbs to the large city trade center. That is the reverse of what is happening in the metropolitan communities. For these reasons, the organization of communities for rural resources development is becoming a much more complicated phenomenon. I shall return to this point later on.

COMMUNITY ADAPTATIONS TO RURAL MODERNIZATION

If communities represent a collective response to life conditions, then what happens when life conditions undergo rapid change? We know that rural modernization is a "give-and-take" process. Many observers of the changing rural scene look out over the landscape and see only decline, decay and disintegration. Other observers, looking more deeply, see renewal, renovation and a reconstituted community life. Both observations may be valid. Change is not absolute in its consequences: it offers alternatives. For example, a small hamlet-centered community can be disappearing and at the same time be in a state of becoming part of a larger modernized community. At what point does the small community decide to switch its energies in dealing with life conditions from the first to the second alternative?

Community life conditions in Saskatchewan do not lend to simple description. At the risk of losing a sense of the "wholeness" of community, I shall comment on six characteristic changes in life conditions.

1. *The emergence of the commercialized and mechanized farm is altering the economic base of communities.* Saskatchewan communities were first established in the expectation that a pattern of small family farms would prevail. The early rude shocks of climate and soil were offset in part by the substitution of scienceways for folkways. Better adapted plants and animals and improved soil management are examples of scienceways. But, in the early 1940s, mechanization and commercialization of Saskatchewan farms—this occurred first in the Prairie wheat farms and later in the mixed-farms of the Park region—started a major transition. Farming as a "way of life" gave way to farming "as a business."

Since change seldom takes place in uniform fashion, pioneer and modern farm conceptions are still in active competition. But the dominant tendency is illustrated by the absorption of over 40,000 small (160-320 acres) farms by farms of one section (640 acres) and over in size. In the Prairie region, the pioneer pattern has almost disappeared. This is the prairie region of the prairie provinces. I am not referring to the prairie provinces as a whole. I am sure most of you know that if you look at a map of Saskatchewan and draw a line from Lloydminster to the south-east corner of the province, anything south of that line is known as the prairie region and north of that line as the park region. The park region is predominantly mixed farms, the prairie region is straight grain farms, and in the south-west, ranching. These are the two fundamental areas you bear in mind when you talk of community change in Saskatchewan. In the Park region it is still prevalent. Now new conceptions of adequate acreage are emerging to challenge those currently in vogue. Vertical integration is becoming an active policy issue concerning the size of farm operations.

From the community viewpoint, the significance of this change is its reflection in higher farm income and associated conceptions of rural living standards. Farmers who have adapted to modern technology achieve productivity increases. Farmers unable to adapt due to acreage and capital limitations are caught on the lower rungs of the technological ladder. The so-called "small-farm problem" illustrates a contradiction prevalent in the life of many communities. An estimated 50-60 percent of Saskatchewan farms remains outside the main stream of agricultural policies and programs. To this category of farmers, Karl Kraenzel's dictum "adapt or get out"² has terrifying significance. In times of urban technological unemployment, many prefer to remain secure in their insecurity. The alternative of low-income farming seems preferable to the risk of uncertain urban employment.

² C. F. Kraenzel, *The Great Plains in Transition*. University of Oklahoma Press, Norman, 1955. See Chapter 21 "The Need to Adapt or Get Out."

Saskatchewan is now entering the industrial phase of development. In isolated instances such as the Esterhazy Potash community, part-time farming eases the financial burden. But the probability of highly mechanized and labour-extensive industry appears to offer only limited alternatives in the immediate future. Although the evidence is not readily available, it seems likely that part-time employment of the housewife in such professions as school teaching and nursing is the more significant alternative at the moment.

2. *Declining and more mobile farm populations and increasing urban populations are altering the social base of communities.* The contraction in number of farms from the high of 142,000 in 1936 to under 100,000 in 1961 is reflected in both quantitative and qualitative differences in the farm population. Only a few of the more significant of these changes can be reviewed. In community affairs, the role of the operator of a large-scale mechanized and commercialized farm firm is fundamentally different from that of the operator of an uneconomic unit. A community characterized by the former—that is, the large scale operator—would be expected to differ from one noted for the latter. Social science research has demonstrated that as one moves up the socio-economic ladder, subtle changes occur in status, participation in community affairs, and conceptions of community adequacy. The disappearance of 40,000 “small” farms means the migration of some 40,000 farm families with an associated impact upon community characteristics.

Population changes associated with the “push” of modern farming—that is, a “push” off the farms—and the “pull” of attractive urban-industrial employment is highly selective. It selects out those who are unable to adapt to new technologies. It also selects out those who are ready to enter the work-productive phase of life—19 to 20 years of age. Thus, young people in Saskatchewan tend to migrate to the cities when they reach the late “teens.” This is the rural counterpart of the “urban bulge.” An estimated 75 or 80 percent of young men and women born on the farm must seek alternate employment in the city.

Not enough is known about the character of this selective process. Probably the man unable to adapt to modern farming is least equipped for the rigours of urban job competition. Probably the children of the modernized farm family can be much more selective in preparing for urban alternatives. They seem more likely to seek university education or trade training. Moreover, there is fairly conclusive evidence in Saskatchewan that sons of larger farmers more actively seek training for the management of their parents’ farms. I am sure you would be interested in knowing that the average size of farm represented by students attending the University of Saskatchewan School of Agriculture has moved from an average of 600 to 800, to 1,000, to 1,300, to 1,500 acres average size of farm, which indicates how strong the bias is in those who seek to further their vocational training in Agriculture.

This is the key point: various studies have demonstrated that small farms, suspicion of credit, larger families, lower educational attainment and labour immobility tend to occur together.

The fact that urban migration is age-selective has many consequences for the rural community. If three-quarters of farm young people must migrate, this introduces a bias in the age-sex structure of communities. There is a dearth of youthful community-trained leadership. The community investment in preparing youth for adult responsibility is donated to the receiving urban community. If that preparation has been inadequate for an urban-industrial society with increasing technological unemployment, then the receiving community must

suffer the consequences. While completion of high-school education is becoming a more common characteristic of rural areas, the latter still lag well behind the educational attainments of urban youth.

I was just looking at a study before coming to appear before your committee this morning, which indicated precisely this situation in Ontario as well. This is something which seems to be generally true of rural areas across Canada.

A further selective factor in the migratory patterns of Saskatchewan communities is the tendency of the retired to concentrate in smaller communities. When such concentrations occur, it frequently selects those retiring on limited and fixed incomes. This introduces a conserving tendency in the very communities which need to modernize for survival. On the other hand, when modernization does occur in community facilities, it often works an undue hardship on a significant portion of the community population. The significance of this is shown by the presence of as high as one-third of the ratepayers in the category 65 years of age and over in some communities.

3. *Changes in the economic and social base are stimulating a need for rural residential planning.* Saskatchewan, in common with other Prairie provinces, started with one of the most expensive residential patterns imaginable. Larger farms and sparser population are making it even more expensive. Physical distance between farm homes costs money in terms of public services. In some townships, as many as 60 per cent of the original farmsteads have been abandoned.

Perhaps I might show you very quickly a chart which will illustrate how severe this has been. We have here three townships which were surveyed by the Royal Commission on Agriculture and Rural Life three years ago, and here we have attempted to account for every family which had ever lived within 17 townships in Saskatchewan. These three represent typical situations. This one is down near Swift Current. The open squares represent abandoned farmsteads. Approximately 60 per cent of the farmsteads in this area were abandoned. Then if we go through the Park region area where there is mixed farming we find not only the abandoned farmsteads, but the farmsteads which are abandoned for part of the year when farmers go into town for the winter. Roughly 60 per cent of the farmsteads in this area are abandoned either part of the year or all year round. In the Sturgis area you will notice this abandonment and the closing of schools which accompanies it. So, you can see how extreme this adjustment in residence pattern has been over a good part of Saskatchewan.

Senator TAYLOR (*Westmorland*): Are those abandoned farms taken over by some other farmer, or are they absolutely abandoned and not used?

The CHAIRMAN: The land is used.

Professor BAKER: The land is all used. In most instances the general tendency is for these farms to be absorbed by larger farms.

Senator McGRAND: There is nobody living on them?

Professor BAKER: Yes, I am talking about abandoned farm buildings.

Senator HORNER: In the northern area you are referring to farms which are abandoned only in the winter time?

Professor BAKER: Yes.

Senator TAYLOR (*Westmorland*): I suppose they go to California or British Columbia?

Senator HORNER: Yes, and to Florida.

Senator McGRAND: Are those people who move off the farms and go into the towns during the winter—it has been mentioned that they go to California or Florida, which is a charge made against the wheat farmers—going into town to find employment for the winter?

Professor BAKER: Not necessarily, but I suspect—I do not have the evidence to present to you on this—that the proportion that goes to California is a very small proportion of the Saskatchewan farmers. I think all of the smaller farmers go to the cities and towns to work for the winter, but those in the larger farm categories go to town to live for the winter and to give their children an opportunity of getting an education.

Senator CAMERON: That is one of the big determining factors—to go to school.

Professor BAKER: We interviewed 90 of these farmers in 1954 and 1955, and we found that a remarkable transformation takes place as they leave the farm and move into the city in terms of amenities that are available to them, such as electricity and direct access to high school facilities, and direct access to health facilities. These are important attractions.

Senator McGRAND: Has Saskatchewan a rural high school system? If it has there would not be any need for moving into another centre in order to get a higher education.

Professor BAKER: Yes; may I mention that later?

The tendency to concentrate urban homes on small lots stands in sharp contrast to the isolation of the farmstead. Yet, in both instances, modern-road, electrical, sewage-and-water, health, education and recreation facilities are necessary.

It is not just the decline in farms that we need to examine. Over the past decade an estimated 30 per cent of Prairie farmers and 15 per cent of Park region farmers have moved into town. Limited evidence suggests that the town farmer may represent families who "buy their way" out of lagging rural services. If this is so, then it leaves those remaining on the farm in even more isolated circumstances. Isolation in physical distance need not mean isolation in social distance—this is an important distinction. The automobile and better roads may mean that farm families are socially closer together than in an earlier day. But at what point is economic efficiency offset by mounting per-farm taxes? It is not just higher standard services that must be paid for; it is also service obsolescence reflecting residential instabilities.

I hope you see the point I am making here. The problem of our communities today is not only do they have to meet new standards of services and education but, at the same time, these drastic population shifts are rendering obsolete the organizational services provided by an earlier day. As I pointed out, country school are being closed down, and we are now having to build schools to modern standards.

Senator INMAN: That applies, in fact, to any rural service.

Professor BAKER: The Quebec "model" of the line village settlement has been encouraged in isolated municipalities. Families are encouraged to relocate on designated main-market roads. There is ample opportunity for this and other types of imaginative rural-urban community residential planning. The dominant tendency at the moment is an undirected drift toward increased physical isolation. Perhaps farm families prefer to pay out more money for independent living; the price of the luxury runs high.

The disturbing fact is that we know very little about the quality of rural farm residences. No comprehensive study has been given this matter anywhere in Canada. The Center for Community Studies is presently drafting such a study for the Prairie Provinces. Central Mortgage and Housing Corporation

has indicated interest in helping to finance the study. The time has arrived when the same public attention should be given to rural-residence patterns as has been evident in suburban housing over the past decades.

4. *The rural trade service pattern is in the midst of a major reorganization.* I have mentioned Saskatchewan's estimated 1,500 incorporated and unincorporated trade centers. In the absence of statistics over a long period of time, not much is known about population trends in the unincorporated places. By "unincorporated places" you will know that I mean centres which do not have their own separate local government. However, about two-thirds of the 500 incorporated places in 1956 reported populations of under 400, and this is an important point to bear in mind.

In general, the trend is toward population decline in the smaller centers and increases in the larger centers. I have a chart here, which you might want to look at, which illustrates this. The census picture is confused by the tendency for the retired and town farmers to locate in smaller places close to the farmstead. Ninety-five per cent of the incorporated places losing populations in the period 1936-56 had 1956 populations of less than 400. Seventy-five per cent of the centers doubling population in the same period had populations over 400 in 1956. Thus we see a distinct tendency toward relatively few large centers growing at the expense of the smaller.

May I say here that I am talking about population changes, and in the absence of evidence I would like to submit that when a trade centre loses population consistently it is then an indicator of advanced economic decline. People do not begin to consistently desert the ship unless there is evidence of its sinking.

What is at the back of this trend? Again we must be wary of the obvious answers. Hamlets, villages and towns do not disappear overnight as in the case of the small farm. They are not only trade centers in which merchants strive to preserve life investments. They are also social centers with strong psychological and moral overtones. Many of the smaller centers have already lost most of their economic bases of community. Community reactions to such losses are often unpredictable. Is this merely a phase in the disappearance of a community, or in its re-definition in terms of an emergency community.

Whatever the outcome, trade and professional services are moving toward fewer and larger centers. Urban values have invaded the countryside through radio, television, press and travel. As farm families enjoy higher standards of living, they become more fussy as consumers. On the other hand, merchandizing technologies are also moving to higher and more expensive standards. Farm family tastes and merchandizing techniques appear to meet in centers capable of drawing upon the income of an expanding trade area. As this happens, many formerly thriving centers become limited-service neighbourhoods, providing groceries, gas and oil, mail, church, recreation.

Other factors facilitate this trend. Almost all country schools are now closed; often they continue as rural social centers, and this is becoming a characteristic. The closing of railroad branch lines has profound implications for many Prairie communities. As grain elevators become obsolete, elevator companies are looking at the merit of larger central storage facilities. Farm-equipment companies have been regrouping service facilities. Government administrative and professional facilities relocate in the more favoured towns. Co-operative stores are consolidating rapidly.

Again the trend toward trade-center reorganization is characterized by more "drifting" than by sound community planning. Inter-town competition rather than inter-town co-operation is generally prevalent. Inter-town competition sometimes becomes extremely intense, as you know if you have ever lived in some of these communities. While there is ample opportunity for

farm city-satellite development, few leaders are imaginative enough to see it. On the other hand, only limited technical resources are available to encourage such leadership. Will the greatly reduced number of trade centers eventually provide a sound basis for satisfied community life?

5. *A radically new pattern of social organization is replacing the pioneer vision.* Modern agriculture and rural life creates a whole fabric—a new social, economic and psychological warp and woof. The social organization of the community is part of that warp and woof. It includes the organization of both the public and voluntary aspects of community living. Here we introduce a new concept of adaptation. Almost all of the adaptations discussed thus far can take place without collective action by the community as an organized entity. Farmers can individually buy up the farms of neighbours. Farm families can individually shift patronage from village to larger town. Commercial organizations with control located outside the community can plan for strategic relocation of services. Probably few of the individuals making such decisions are aware of the consequences for local social organization. Yet when these decisions are counted in the aggregate, country schools close down, road systems become obsolete, hospital services require relocation, churches become part-time ministerial outposts.

The process of social disintegration and reintegration is so complex that no simple analysis will prove adequate. The crucial point is that individual adaptations are replaced, or must be replaced, by collective decisions. Would prairie grain farms have adapted to mechanization as quickly as they did if dependent upon majority rule?

Collective wisdom tends to lag far behind the wisdom of leading individuals. This is the simple genesis of much of the rural communities' current crisis. A few examples will suffice. Rural municipal government is lagging far behind urban municipal government in most Canadian provinces. The farmer's fear of higher taxes and of loss of personal controls over the elected representatives causes extended delays in needed reorganization on a larger-unit basis. Even when larger units are established, some of the farmer's doubts are confirmed by failure to train trustees and administrators for much more complicated responsibility. Then, when this happens, provincial governments may again encroach on local jurisdiction under pressure of "urgent" provincial and national needs. Mr. Chairman, if I might cite an example of this, something to speculate upon: in Alberta, where they have larger units of local Government, there was recently established a 32 mill rate right across the board. Now, if you think about this carefully you will agree that this introduces a fundamental change in the character of municipal administration because arguments about the tax rate is surely a critical way of involving local people in public affairs, but once this rate is established right across the board by the provincial Government you have a change where the decision making in public affairs is taken away from the local people. I could enumerate to you any number of ways in which the provincial Governments make decisions through which all initiative is taken away from the local area. Yet adequate larger-community planning is obviously dependent upon some correlation between community and local government jurisdiction, and this larger community is at least somehow related to the unit of local governments.

Perhaps the most ingenious collective invention known to Western democracies is the voluntary organization. If we assume a conservative average of 20 voluntary organizations in each Saskatchewan community there would be 30,000 of them in the province. If each has at least four elected officers, this would mean 120,000 *individuals* holding positions of some responsibility (this does not allow for overlap). If to this is added the membership of standing

committees, then it is not impossible that a quarter of the population is actively involved in voluntary effort. In one of our communities we discovered that, in the month of March, eighteen community leaders devoted an average of 40 hours per month to voluntary effort. Conversion into provincial man-hours at minimum wages gives astronomical estimates of the worth of the contribution.

The cynic will be quick to say that much of this effort is of no great significance. I have personally observed nations in which voluntary community associations have just begun to emerge. National programs have been devised to stimulate their emergence. Several authorities have noted that, in communist-dominated countries, voluntary associations are deliberately discouraged or converted into state instruments. Beyond all of this, we do not know enough about the sense of personal prestige and individual significance to be credited to such participation. This does not mean that other political systems may not be able to give significance to the individual. But ours is a system which thrives on the plurality of special-interest groups mediating between citizen and government.

I dwell on this point because it is one of the most extensive components of community living and the least studied and understood. To what extent are town and country organizations merging? What happens to the voluntary associations of a community—the agricultural society, the local co-operative, the Homemakers, Home and School, the Board of Trade, and so on—as population and trade decline? How do they “find themselves” again in the emerging larger community? What happens to voluntary associations as social and economic issues become more complicated? The evidence suggests that voluntary organizations are also becoming larger, more specialized and less community-related. Decisions previously made at the “grass roots” tend to be passed down from Provincial and National headquarters. I wish I could take the time to describe how this process works. Decisions are sometimes made in Toronto, which are reflected in Saskatchewan; somebody in Toronto decides that there should be an increase in the quota of some particular society, and this brings about an increase in the number of members in some faraway place.

It seems likely that the transfer of voluntary responsibility out of the community weakens but does not replace local relationships. Let me offer two examples.

The care of the aged is becoming a social problem all across Canada. At one time families and communities assembled their own resources to meet this need. Now, Provincial and Federal governments come to the assistance of communities in financing “old-folks’ homes”. Communities, taking advantage of this, build fine homes—and then forget about the aged residents as far as community living is concerned. A fundamental adaptation has been made in the meaning of voluntary problem-solving. Another example is the provision of grants-in-aid for establishing community recreation boards. Having established such boards, many communities wonder what to do with them.

This point is fundamental in understanding the relationship of communities to rural-development programs. The social organization of communities is basically different from that of government and commercial enterprise. The latter tend to be “bureaucratic” and more “rational”: community organization tends to be diffuse, personal and “face-to-face”. Unless this is understood, then the best conceived “outside” program will not achieve its full potential. There is a common misconception among resource-development personnel which causes them to legislate for local “voluntary” organization. As a result, they fail to give realistic thought to the voluntary organizations which already exist in every community.

I cannot do more than touch upon the evidence that many communities have become "overorganized". This often happens because "outside" groups put pressure on them to create new organizations. Combined with this is the tendency for relatively few leaders to occupy many leadership positions. This often introduces inflexibility. Overorganized communities can also be "under-organized" because no leadership is left to move into new community problems. Community-improvement programs seem often to be neglected in this way. Voluntary organizations, like communities, do not die easily.

Many continue long after they have served their original purpose. Often this may happen because an important "pay-off" for volunteer effort is the local status and prestige which comes with election to office. This raises two other large questions. This is based on an actual study we did on a community of 1,500 population, in which we interviewed the officers of 240 voluntary associations in that community. The existence of as many as 140 to 200 voluntary associations in a small community—or even 50 organizations, which is, perhaps, more normal—makes difficult new organization focusing on the problems of the whole community. Communities do not have cabinets or boards of directors to co-ordinate activity. Unless leaders can skilfully create conditions for the making of wise community decisions, serious imbalances in development can occur. The Center for Community Studies has been trying to understand this difficult problem.

Then, too, most communities are now "ringed about" by as many as twenty different government and non-government extension agencies. Each has ambitions for the community. Each seeks the help and loyalty of community leaders. The time is fast approaching when extension agencies must themselves seek to work together if they are not to debilitate communities. Again, this is a crucial issue in undertaking comprehensive rural-development programs.

I could give you a good many examples in the prairie provinces of the way in which extension agencies cancel each other out. One goes in first, and then another comes in and cancels out the work of the first. They compete for time and their programs overlap, or they contradict each other, in many instances, and this is a thing you come up against when you talk about community development in the rural sense. It is accentuated by the fact that few extension workers have any more than preliminary training in the principles and practice of community organization.

6. *Rural community values—the goals to be sought—are currently in a state of ambivalence.* When community living is traditional—when change is gradual—the "answers" to the goals of individual and community living are ready at hand. Experience dictates them. But in times of rapid change such as the present, many conflicting values are at work: large farms versus small farms; rural versus urban employment; farm versus town residence; voluntary effort versus government effort; small local government versus large local government, and so on. Anyone working in rural communities in comprehensive development programs soon becomes aware of the many contradictions which farm families must now resolve. Many of these contradictions, are basically problems of values. Since many current values are injected into the community from the outside, it becomes much more difficult to reach agreement on "things thought worth while."

I am satisfied that much of the current dilemma of rural community values is related to limited opportunities to obtain appropriate information. Our agricultural-extension services are a classic example of this.

Perhaps I might make a reference to a document we have just prepared for the Resources for Tomorrow Conference. It is a survey and assessment of

the role of agriculture extension in comprehensive resource development. In terms of its potential for resource development you will find this document gives considerable detail.

By and large, they are still geared to provide production information at a time when farm families want farm-and-home-management, public-policy and community-organization information. Even where agricultural-extension services are striving to provide such information, they are not being backed up by programs of economic and social research. There are few strong departments of agricultural economics in Canadian Faculties of Agriculture. There are no strong departments of rural sociological research.

One wonders why professional personnel in agriculture are still inclined to drag social research in by the back door. Even when social research is discussed, it is likely to be in strictly economic terms. I submit that no one who has had any direct experience with the solving of community problems can fail to recognize that few situations can be understood in purely economic terms. The low-income farm problem is the best example we have of this. It is a difficult combination requiring economic, sociological and psychological insight. The work of Dr. Helen Abell (a rural sociologist with the Canada Department of Agriculture) on farm decision-making and extension for home-making stands out almost alone in this respect in Canada.

Time will not permit me to say more on this point. I am convinced that responsible agencies are even now rendering a serious disservice to Canada's farming communities by failing to provide the balance of technical resources which these rapidly changing times now require. It is little wonder that, under these circumstances, there should be considerable ambivalence in achieving agreement on things to be done in giving better direction to the immense job of rural redevelopment now to be undertaken.

Mr. Chairman, I could skip this last page, if you are pressed for time and want to have more opportunity for questioning.

Senator STAMBAUGH: Will you give us a definition of "ambivalence"?

Professor BAKER: Well, it means you are not sure of the ground you stand on. There are pressures that take you this way and pressures that take you that way, and you are sort of caught in between: you are uncertain; you cannot make up your mind.

The CHAIRMAN: Perhaps you would read the last paragraph.

Professor BAKER:

The Opportunity for Resource Development Through Communities

At the risk of taking too much of the time of this Committee, I have dwelt in some detail on the adaptations currently under way in Saskatchewan communities. I have done so because I have been impressed by the imaginative manner in which this Committee has tackled the difficult problem of rural development. In almost every one of the submissions made to the Committee, some mention has been made of the role of community factors in further development. The careful study by the Committee of the United States Rural Development Program underlines the vital contribution of voluntary citizen participation through community action. It would be tragic if Canada failed to recognize that country's—that is, the United States—long history of an agricultural-extension service geared from the beginning toward active education through community activity. The United States is far ahead of this country in creating a staff of professional extension *educators* backed by competent training and social research institutions.

One of these situations that your team studied in the United States was in the State of Kentucky, which I know of in considerable detail. Kentucky has a deep and rich history of concern for its communities, which is quite

different from that which we find in Canada. When we in Canada attempt to interpret the results of the Kentucky program, in terms of Canadian conditions, we need to recognize this historical fact.

Canadian leaders will need to be critically aware of both the limitations and contradictions in applying the American model. The conversion of established Canadian extension agencies—whether agricultural health recreation, education, or others—into more basically whole community-oriented programs will require careful planning for educational competence. This does not mean that our extension agencies are not in many instances giving strong leadership on this matter. Perhaps it would be more accurate to say that they are not being heard. The Center for Community Studies in Saskatchewan is now deeply involved in the problem of adequate research training and consulting facilities for community development. It is impossible to satisfy all current demands.

Our problem today is that we are simply swamped with demands which are quite beyond our capacity to handle. It is a symptom of the great concern we have for a better understanding of what we mean by community development.

My concluding suggestion is that, unless specific attention is given to an early build-up of the resources for educational competence, then the comprehensive rural development programs now being so imaginatively formulated will fall on stony ground. As W. Arthur Lewis has observed, "the proximate causes of economic growth are the effort to economize, the accumulation of knowledge, and the accumulation of capital."³

The communities which are emerging on the Prairies now have a potential for leadership in resource development which has scarcely been tapped.

I have seen some marvelous development programs under community leadership. We have not explored this as much as need to. The contribution of accumulated knowledge ought to reflect the needs of the emerging community if it is to play its proper role. The dissemination of that knowledge through already established and emerging community voluntary participation will not be readily accomplished unless resource-development leadership understands the unique character of community organization and growth. Arthur Mosher sums up my presentation: "It is persons, individually and through social organizations, who can both use and create technology . . . development is dependent upon the emergence of attitudes and values of persons not only consistent with but conducive to change, risk, personal choice and acceptance of responsibility, and trust and co-operation within social organizations."⁴ Our changing rural communities provide the "arena" for the social organization without which rural development loses much of its significance. An understanding of both non-directed and directed community development seems essential in the further growth of our agricultural economy.

Here the difference is between letting communities drift along without knowing what they are going to be in the future, and helping give them more direction and assistance in making their decisions and understanding the things essential in the further growth of their agricultural economy.

I hope, Senator Pearson, this has been somewhat useful.

The CHAIRMAN: Thank you, Professor Baker. This brief has certainly been well thought out. There is a tremendous amount of thought in this brief you have presented to the Senate committee today.

³ W. Arthur Lewis, *The Theory of Economic Growth*, London, George Allen and Unwin Ltd., 1956, p. 164. (underlining is the author's)

⁴ A. T. Mosher, "Interrelationships Among Agricultural Development, Social Organization, and Personal Attitudes and Values," *Interprofessional Training Goals for Technical Assistance Personnel Abroad*, Council on Social Work Education, New York, 1959, p. 91.

Senator McGRAND: When you were comparing the rural development in Kentucky with what there is in Canada were you limiting your comparison to what is going on in western Canada, or to what is going on in the older parts of Canada?

Professor BAKER: I was comparing it with the older parts of Canada. There are two reasons for this. In Kentucky they have two departments of rural sociology, the federal and the University of Kentucky, which have been studying and trying to understand these problems. In the war years they organized neighborhood programs, and these were some of the more highly successful war programs in the United States. They had the equivalent of the Saskatchewan Royal Commission on Agriculture and Rural Life, but this was a voluntary citizen effort, and this has made Kentucky a rather unique laboratory in respect to rural development.

Senator CAMERON: When you look at what the three agencies, the federal and provincial departments of agriculture and the universities are doing, and if we accept your thesis, you see that they are not focusing on the sociological aspects of the community. What suggestion have you to make with respect to re-organizing these services so that we can get a more effective bearing on the community problem?

Professor BAKER: The important part of what I have in mind when I talk about the educational competence of those who work with communities can be illustrated by the fact that most of our agricultural extension people, or agronomes, in Canada receive their training in farm production and animal husbandry, and they are not trained to deal with these things, and certainly not with human beings. This in itself makes it difficult for them to work with communities and to tap the full potential of communities for their self-development. In addition to that, our services in Canada tend to be organized pretty much from the top down, so that what tends to happen is that communities are not adequately organized to identify their own needs and to utilize the resources which are available to them through the departments of agriculture. They have to fit in with more established programs which are imposed from the outside, although not consciously or maliciously imposed. This means that they very often do not accomplish all that they could accomplish in terms of rural development.

Senator HORNER: Do you mean there that this whole program with respect to community life is centred on money rather than on need?

Professor BAKER: That bias can even creep into it. The fundamental problem here is that if somebody comes in with a program a farmer says: "I am not going to buy that program unless it makes sense to me in terms of my conditions". If the farmer's problems can be related to the program then he is more likely to become concerned about it.

Senator INMAN: Do you not think that the younger people are getting away from that idea? I am thinking now of the 4-H clubs, and all that sort of thing.

Professor BAKER: You must remember here that 75 to 80 per cent of these young people at present on the farms are not going to remain on the farms. Also, it takes a fairly long period of time, from the point of view of getting established in farming, before farmers become interested in these things. There is that characteristic. Farmers do not tend to use extension services until they are in the middle years of life, which means that until they are 40 or 50 years of age they do not move into the extension services.

Senator INMAN: I am thinking of my own province of Prince Edward Island where there are established so many of these 4-H clubs, and the young people seem to be taking a very great interest in that sort of thing.

Senator McGRAND: Is there any connection between the question Senator Cameron asked you and the statement you have made which is as follows: "I am convinced that responsible agencies are even now rendering a serious disservice to Canada's farming communities by failing to provide the balance of technical resources which these rapidly changing times now require"?

Professor BAKER: I think there are two distinct facts that I have in mind there. One is that farm families in the Prairie provinces—and this is true elsewhere—are getting much information now on the range of problems they are up against. They are understanding the marketing problems and they are concerned about understanding their communities and the problems of management. When I go out to talk with farm people and try to give them the picture of all the changes that are occurring in their community the characteristic reaction I get from farm people on this is: "By golly, I have known that this is happening, and that that is happening, but I have never put these things together". No extension service, to my knowledge, is providing this type of information in Canada. This is what farm people are asking for so that they can begin to deal intelligently with the situation they are in. They are getting pieces of information, and this is confusing them rather than helping them.

Senator TAYLOR (*Westmorland*): I would like to make a statement, and then ask a question. I want to refer to your statement in connection with extension workers. Is it not true that in recent years there has been on the part of departments of agriculture and colleges, which are training technical men in the field of agriculture, a tendency to specialize particularly in farm management and community activities? For instance, I was thinking in terms of my own province of New Brunswick in which I had something to do with the administration of the Department of Agriculture. There it was our policy—and I think it was generally the policy of all departments of government—to select extension workers from rural people, from people from the rural areas who know the problems of the rural farmers. They are men who are trained not only in the field of production and scientific matters but, in my experience, they are being trained in farm management and community work. They are doing far more today than they were doing 25 years ago.

As a matter of fact, I recall that I was the first agricultural representative appointed in the province of New Brunswick away back in 1917. The work of the agricultural representative at that time was very different from what it is now. I think there has been a vast change in that field, especially in scientific research and experimentation. It does not matter too much where the person comes from. He can come from the city and still be an exceptional worker in that field, but with respect to extension workers as far back as 1938 we started in our department a policy of farm planning. We appointed a man in charge of that type of work, so I do think we have made some progress in that field.

Coming back to the question I want to ask I will refer you to your statement that as many as 60 per cent of the original farmsteads have been abandoned, and that the tendency to concentrate urban homes on small lots stands in sharp contrast to the isolation of the farmstead. That brings up the point which I have given some thought to. In fact, I have a long letter from one of our federations of agriculture in my area with respect to this. What is to be the answer in respect to our taxation system in rural areas? We have now reached the point where the farmers claim they just cannot bear the tax load.

To illustrate what is happening, I know of a farm, the buildings of which were all renewed prior to 1945 but there has been nothing added since, where the taxes were less than \$100. Last year the taxes on that same farm, without there being added any additional land or new buildings, were over \$700. That

farmer tells me that he cannot possibly pay the taxes on that farm, and I am being asked: "What is the answer to farm taxation in rural areas today?" Can you give us the answer?

Professor BAKER: Senator, may I make a brief comment on your first statement. One of the difficulties in replying to questions is to give credit where credit is due. There is no doubt about the very great progress which the extension services across Canada have made, especially in adapting to these new demands being made upon them. My answer is that due to the rapidity of change, and the fundamentality of change that is taking place in agriculture in rural Canada, even these changes are lagging far behind the demands being made by farm people. I want to make this point without discrediting in any way some of the magnificent moves being made by extension people in Canada.

Senator TAYLOR (*Westmorland*): I thought you were sort of neglecting the work which has been done.

Professor BAKER: Not at all, but I do say that a tremendous lot of work has to be done.

Senator CAMERON: I think it is true to say that the main concentration of agricultural extension services has been on production rather than on community living. There is a change taking place, and one of the reasons why more attention is not being paid to this is that we have had no training institution in Canada placing its emphasis on the new kind of thinking necessary. It seems to me that if we are to get effective use of the money we are spending through these various extension agencies we have to take a look at the provision of training centres for this new kind of extension matter. There are changes taking place in the universities. For instance, in my own university, where at one time we had one person in the department of sociology, we have eight persons today. But, as you point out, there is a tremendous lag in catching up with the needs.

Professor BAKER: Particularly in regard to farm management and public policy. So far as research is concerned, we cannot do a good extension job without good research. That is a real problem.

Senator CAMERON: Has your experience been that there is a resistance on the part of farmers and farm organizations, towards spending money on research of this kind?

Professor BAKER: This attitude is changing rather quickly. My work deals mainly with farm groups and urban groups, and I am always impressed or disturbed by the fact that farm groups tend to lag behind the rest of the groups, refusing to recognize that they are up against tough technical problems. It is a problem for them to learn how to use the experts as well as to get the needed experts to help out in solving these problems.

Senator McGRAND: You spoke about the question of the increased number of people engaged in your type of work. Are those people with rural backgrounds?

Professor BAKER: Both. Could I just say this though, Mr. Chairman. We need to re-examine what rural background means under present-day conditions. There was a day for instance when I knew my community because it was always around me, but we no longer know our community. So "rural background" can be a trap for an extension worker now. This means that experience has to be supplemented by both research and training if he is going to do the job he is called upon to do today.

Senator TAYLOR (*Westmorland*): But I still think it is most important that he should know something about conditions on the farm.

Senator McGRAND: What I meant to ask was, were these people who are generally engaged in this work born on a farm? There is a difference in forestry work. A great many of the fellows going into forestry are people who were born in the cities of Toronto or Montreal. But I was under the impression that for this work in agriculture the people engaged in it must have had a farm background.

Professor BAKER: That is right.

The CHAIRMAN: Professor Baker, in the matter of the change from small farms to larger farms...

Senator TAYLOR (*Westmorland*): Mr. Chairman, please do not get away from this question of taxation.

Professor BAKER: We gave a great deal of attention to property taxes in our royal commission report. The commission studied this question a few years ago. One of the points I wanted to make is that really we have not thoroughly examined the implications of the rural property tax for financing real public services. It is not just a matter of the balance between property taxes and the provincial and federal sharing the costs, but we are up against this obvious fact that we have not yet attempted to examine the rural pattern that is emerging and say what this is going to cost us. There is no doubt if you want to set up a residential pattern as expensive as you can possibly imagine just set up the pattern we have in Saskatchewan; every time that a power line has to be built or a road constructed you have to go to the public services board. Under this setup you are paying extremely high prices for this privilege. Until we thoroughly examine this aspect of the problem we are not going to have all the information we need to come to some solution of the residence property tax. I do not think the answer is going to be found by relegating financial responsibility to provincial or federal levels of Government.

Senator TAYLOR (*Westmorland*): Mr. Chairman, I would like to give the committee some idea of the situation in my province, New Brunswick. We have rural high schools and they have cost us a lot of money and the cost of education has increased tremendously since 1945 as have all services, and yet, in a great many cases, the prices of goods that the farmer sells are not as high as they were in those periods. In addition to high school boards we have county assessments done by a board of three men, and things have reached the point of perfection, or imperfection, that the assessors come on to your farm, they go through your house, measure your house, measure everything that is in it and you are assessed for every improvement—they assess you on every piece of machinery, on every animal on the farm, on each pig, sheep, cow and everything else, so that taxes have gone up to the point where the farmer is not able to pay them.

Senator HORNER: Are you speaking now of farm land?

Senator TAYLOR (*Westmorland*): Absolutely.

Senator HORNER: Well, in the west we never attempted to tax improvements. No farmer was ever penalized in the west for improving his farm.

Senator TAYLOR (*Westmorland*): Well, now we are taxed so much on cleared and cultivated land, so much on bushland, so much an acre on timberlands and then in addition to all that you assessed on everything that is on that farm, even so much for an apple tree.

Senator HORNER: Well, Mr. Chairman, that has never been so in Saskatchewan.

Professor BAKER: Mr. Chairman, may I make two observations: One is we may need to consider the implication of this rather important fact, and that

is that land taxes have been a poor competitor with other farm costs. Fifteen years ago the land tax took about 8 per cent of the total farm costs and this has gone from 8 to 10 or 11 per cent, and now it is something like 13 per cent of total farm costs. So, Mr. Chairman, in terms of general expenditures on the farm, land taxes have been a very poor competitor with other costs. The other problem we are up against is that taxes on property on land no longer reflect the pattern of investment that farmers have in their enterprise because increasingly farmers' capital is tied up in machinery and so forth, and what the implications of this are, has not been thoroughly examined.

Senator McGRAND: Mr. Chairman, that appertains to the city also. There was a time in the cities when the services were so limited that real estate could bear the costs. Whether the real estate was rural or urban it was expected to pay the very small amount of taxes. But today most of the taxes are still borne by real estate and the services have multiplied so much, whether it is rural or urban land, it is the same thing, the taxes have grown so much that they are becoming a burden.

Senator BARBOUR: Mr. Chairman, after all, the demands of the people for more services and better living conditions are responsible are they not, for setting the rate of taxation?

Professor BAKER: The point is relevant here. There is no doubt in my mind that rural areas are now carrying an undue burden of taxation. If rural communities are responsible for educating 75 per cent to 80 per cent of young people who will eventually find their way into the city, is it fair to expect the rural communities to carry the major portion of the cost of educating these people? Is this not a larger social responsibility that should be shared with other levels of Government.

Senator TAYLOR (*Westmorland*): Taxation is reaching the point in some areas where a house and a lot is taxed higher in rural areas than in a city area.

Senator HORNER: Mr. Chairman, in my 55 years of living in Saskatchewan I was reeve of my community for a number of years, and I well remember that there was a certain mill rate that we had to pay to the provincial Government, and we reeves adopted a policy of keeping our assessments down and raising our mill rate sufficient for our own budget. Eventually the provincial Government appointed a special assessment commission to go over the whole province and check the assessments in each municipality because the province felt they were not getting sufficient. These special commissions raised assessments way up in order that the province might receive more receipts. I was all for keeping taxes low. Each time that I would drop out of office for a while the municipality would get into debt with no credit at the bank and then I would go back in office, lower the taxes, pay off the debt and shortly after I left it would be in debt again. However, I would like to refer to the question, as was mentioned by Professor Baker in his brief, of the great withdrawal from farms and farmers becoming fewer. That was bound to happen in a province that was settled by people who were not naturally farmers. The homesteads were offered at \$10 and so on, and this attracted a lot of non-farm people, people who liked to live in villages. Many of the people in western Canada today are people who came from farming areas in other parts of the world where the farmers lived in villages. This was particularly so in France. Even in France and a great part of Germany that I was through there were great areas where they live in the villages and go out to the farms. I remember we had a Czechoslovakian clergyman with us, and he thought it was awful that with not so severe weather they did not live on the farms. Perhaps they had little houses out for camping, and perhaps they left someone to take care

of the stock, but they lived in the villages, where they could have social evenings, and so on. He thought it was terrible the way we live in Western Canada on the farms.

The CHAIRMAN: There is a tendency in the west now to move into villages from the farms, is there not?

Senator HORNER: Yes.

Professor BAKER: Yes, but whether it is a permanent movement or not, I do not know.

The CHAIRMAN: Would that reduce the need for services such as roads and telephones in the country?

Professor BAKER: Unfortunately, I think, at the moment, it complicates services, because only a portion of the farmers are moving into villages, so the services will still have to be provided, and at greater expense to those who remain. Say 30 per cent move in, the other 70 per cent are even more isolated.

The CHAIRMAN: Some areas are establishing a small block of 40 acres outside the town, they are moving buildings into that area, and they might even provide feed lots and keep their stock there. They are moving most of the grain in there, and then they go out and farm from there. The families stay in these small areas and have the benefits of the schools. Is that taking much hold in Saskatchewan?

Professor BAKER: Not very much. As a matter of fact, there are no major changes taking place on any planned basis. I do not remember the actual municipality in western Saskatchewan, but they designated, "This road will be the main market road", they encouraged families to move out to it, and this movement introduced great economies in the expenditures which were borne. But the problem for the mixed farmer, who has to move his livestock or provide feed lot arrangements, is complicated.

Senator CAMERON: There has been some development of that kind in Alberta, for instance in Cardston they have large areas around the town where they bring in the stock. In these areas where there has been a 60 per cent abandonment of farmsteads through absorption, has there been any specific case you know of in a municipality where the remaining people, the people who are operating the land today, have moved together along a market road and are living in a sort of semi-village state? And if so, is there any evidence of saving, as the result of the abandonment, in the building of roads, maintaining roads, in the curtailment of electric and telephone lines, and so on? Are there any illustrations of this yet?

Professor BAKER: Only in isolated pockets. I wish I could remember the study we did on this in the course of the royal commission's work. We took 18 townships and said, "If you could be king for a day, and re-locate these roads in such a way that we had maximum efficiency what would be the effect?" I think we found, but I could be incorrect, that we could reduce the 60,000 miles of roads networks we have in Saskatchewan by something like 30 per cent. You take 30 per cent of 60,000, when the cost is anywhere from \$2,000 to \$4,000 per mile of road, you can see how significant the saving would be. This is happening in what we call the grid road system, but this is like laying out the main street of Ottawa and neglecting the feeder systems. This is the real problem, getting access to the main roads in winter time. That is where that problem comes in. How do you get people who are three miles off the road in, in terms of feeder network? The other thing that complicates this—and we are not yet able to fully understand—is that farmers are able to make these changes individually as I mentioned a moment ago, but when it comes to doing something about it as a group the characteristic we run into is that when you get into the little towns, what you find when you talk to the

merchants on the main street is that they have lost hope of the future for the community. In other words, they psychologically kill themselves. There is a sociologist named Merton who has demonstrated the self-fulfilling prophesy. In very simple terms it means that you become what you believe you will become. If you believe you will become a dead town you begin to act that way and, sure enough, you do become a dead town. I could take you into communities in Saskatchewan, with a population of 600, where in social and economic terms they ought to be in a far better position. When you talk to the leaders of the community you find they are dead. This is not only an economic but also a social and psychological problem, to understand what makes certain communities thrive and so many others dead and unable to respond to the challenges which changing times are casting at them. If we are going to get into effective programs and recognize community resources, we are going to come up against the problem that relatively few communities today are really able to tackle their problems on this basis.

Senator HORNER: Speaking on that question, in my experience—and I wonder if it has been yours—when you speak of the factors that make one community fall back and another thrive, it has been a few outstanding men in the community who have helped a community to thrive, which men other communities lacked. There have been few men of great drive and social consciousness who have worked for the welfare of their community. That has made some towns go forward and others backward.

Professor BAKER: The illustration I use on this very relevant point is that some wise man once said it always takes slaves to build a civilization. There was a time in ancient history when slaves comprised the great mass of the population, and they worked for the luxury few. I am satisfied that the "slaves" of modern times, today, are the handful of leaders who are concerned about building a civilized community so that others can enjoy it. So you find in most communities that relatively small number of people provide the key leadership. If we are going to talk about developing adequate communities we still have to examine why it is this leadership dies out in so many communities; why they lower their sights, their perspective, and aim at something below their actual level of accomplishment, or ability to accomplish. This is so fundamental to our kind of society. If we find communities which are unable to come to grips with problems they are now faced with, these decisions get cast to higher levels of Government. This fundamentally changes the character of our whole society in the long run. That is why I am so concerned about getting a better understanding of what it is that makes communities tick or fail to tick.

Senator McGRAND: Where would you say this movement should start?

Professor BAKER: We have had some rather intensive discussions on this. I am not so sure we need to start a movement here. We have been building communities ever since we settled this country, but conditions have changed. I think we must recognize we need a different kind of competence.

Senator McGRAND: Where are you going to start with a different kind of competence?

Professor BAKER: This is something like a farmer knowing more now than he is using. I think we know more now than we are actually using.

Senator McGRAND: Should it come out of our schools? Should our boys and girls get some training in this while they are still at school?

Professor BAKER: This is part of it, though I am inclined to think the place to start is with our present leadership training programs for our voluntary leaders and the training of our extension workers, whether agriculture extension, health educators or recreation specialists. We have to train the leadership

we have and, unfortunately, I think we are not set up to do it very well in Canada at the present time. I am prepared to go on record as saying I am frankly ashamed of the level of leadership training which, in general, we are making available to the farm, rural people in Canada today. It is not adequate to the responsibility we are asking them to accept.

Senator CAMERON: There is one question I would like to ask before we close. How do you think, Professor Baker, that this picture you have given us of the abandonment of farms and the concentration in large centers, will react in terms of the report of the MacPherson Royal Commission on Transportation in relation to the abandonment of branch lines? Do you think that the communities are prepared to accept that recommendation, which I think is a good one, that many of these branch lines have to be abandoned?

Professor BAKER: I think a realistic answer to this is that no community is prepared to accept the closing down of its branch line. It will fight it as hard as it can, because to admit that the branch lines can be closed down is to admit that the communities are no longer needed. I agree with Senator Cameron's observation, that this is a move which is only one of a series.

Senator HORNER: In regard to this abandonment of branch lines I wonder what co-operation could be obtained from the provincial governments. I am thinking now of the movement of the Saskatchewan Government into the transportation business. If it was crossing the country and serving points which had no railroad then it would be a different matter, but they have built a highway, for instance, parallel to the railway line between Regina and Saskatoon. In an endeavour to make a little money the railway maintains its own track and runs a train, but the Saskatchewan Government runs a bus along the highway at the very same time. The bus and the train run side by side, each of them half filled. Yet, the Saskatchewan Government will complain bitterly about the abandonment of branch lines.

The same thing applies between Battleford and Prince Albert. The railway has to maintain its line in order to be able to haul our grain out in the winter, but the Saskatchewan Government puts on a bus. We now have one car on a freight train whereas at one time we used to have a nice train. The bus is now running along parallel to the railway track. Both systems are owned by the people of Canada.

With respect to trucking, I would prohibit trucks where the railways are capable of giving the service. We are finding ourselves in a position where we are pleading for branch lines to be maintained, yet provincially we have done everything towards putting them out of business.

Senator CAMERON: I would like to congratulate you, Mr. Chairman, for arranging to have Professor Baker come here to present one of the most interesting and significant papers we have had before this committee. On behalf of the committee I would like to express our appreciation to Professor Baker for coming here and presenting this very thought-provoking paper, a paper which I am sure will be very useful in helping the committee to come to some conclusion as to what needs to be done.

Senator HORNER: I agree entirely. I must say that this is a new approach to the problem.

Senator TAYLOR (*Westmorland*): I would like to second Senator Cameron's vote of thanks, and say that what we have heard this morning points up to us again the tremendous problem that is facing rural development.

The CHAIRMAN: Thank you very much, Professor Baker.

The committee adjourned.

APPENDIX

A BRIEF DESCRIPTIVE STATEMENT ON THE CENTER
FOR COMMUNITY STUDIES*Origin*

The Center for Community Studies was created in 1957. Its establishment reflects a pronounced trend on the North American continent toward university-affiliated research bureaus and institutes. There are now over 1,300; one-half are related to the social sciences. Almost half of these have been established since 1950.¹

Objectives

The objectives of the Center are to undertake research, disseminate knowledge and offer specialized advice with respect to the applied social sciences and the processes of community education. The Center's specialized subject matter is the theory and practice of community change and development. An estimated 1,500 trade-centered communities exist in Saskatchewan. Each of them is organized to deal with certain life conditions shared by the inhabitants. Under contemporary circumstances of rapid change, there is a wide demand for improved technical understanding of this phenomenon.

Organization

The Center operates as an independent unit under joint University-Government sponsorship. The Board of Directors is appointed under Order-in-Council pending more permanent arrangements. The Honourable O. A. Turnbull is Chairman. Other members of the Board include President J. W. T. Spinks, Dean J. W. Macleod, Mr. G. South, Mr. R. L. Stutt and Mr. C. H. Whiting. Mr. South and Mr. Stutt are members of the University Board of Governors. Mr. Whiting was formerly Chairman of the University Board of Governors. A Director is responsible for general administration. Research, teaching and specialized advice are the responsibility of the Chief Officers of three divisions: research, training and consulting.

Finance

The 1961-62 budget of the Center is estimated at \$274,000. The Saskatchewan Government grant represents just over one-half of the total budget. The balance is made up of special research grants and fees for contract programs. Center policy is designed to diversify income beyond a relatively constant Government grant. This grant ensures tenure and standards essential to the attraction of professional personnel. All professional appointments are made in terms of salary and standards equivalent to University academic ranks.

The University provides office space and accounting services. Its policy permits close research and teaching collaboration between Center and University.

¹ *Directory of University Research Bureaus and Institutes* (first edition), Gale Research Company, Detroit, 1960.

*Activities**Research:*

The general focus is analysis of social and economic change with reference to communities. Since communities are not isolated from broad trends, the approach is essentially selective, inter-disciplinary and both descriptive and analytical. The professional staff of eight has advanced academic training in such disciplines as sociology, economics, anthropology, social psychology and history. Slightly over one-half of the total Center budget is consumed in research activities. This does not include administrative costs which are allocated to the Director's office.

A listing of current and anticipated research projects will illustrate the range of the Center's interests: two studies of specific community change (a declining trade center and an industrializing trade center); a social-psychological analysis of leadership motivation; a study of 140 voluntary associations in a large town; an analysis of population and migration in the Prairie region; an economic and anthropological study of Northern Saskatchewan (contract); a two-year study of the organization, content and environment of Co-operative Education programs (contract); a sociological and economic study of small farmers (Canada Department of Agriculture extra-mural research grant); a three-year field study of rural housing (C.M.H.C. grant).

The research staff maintains full control over the selection and design of its projects. Studies are chosen on the basis of the special interests of the individual research worker within the broad framework of the Center's objectives. All contract projects involve the employment of extra professional staff. Where practical, projects are carried on in co-operation with University departments. Such an arrangement now prevails with the Department of Social and Preventive Medicine and Psychology and the College of Commerce. One staff member holds a joint appointment in the Center and the Department of Economics and Political Science.

Consulting:

The focus of consulting activities is specialized advice to the extension professions (agricultural representatives, social work, sanitary officers, conversation officers, health educators, adult educators, school superintendents, etc.) and voluntary-organization leaders. The advice given has to do with insight into the special character of community organization and planning. No similar technical resource exists in the Prairie Provinces. The academic training of the two members of the consulting staff includes sociology, social psychology, agricultural economics and extension education.

For an initial period of three years, a joint arrangement has been undertaken with five communities selected from 170 original applicants. This was to provide first-hand observation of how communities presently deal with problems common to their citizens. Limited advice has been available to these communities during the arrangement. Under no circumstances does the consultant direct the community program: responsibility rests with a community council representative of all active local organizations.

This arrangement has permitted exploration of community-program innovations. Does the community-council idea have anything to offer to "overorganized" communities? How can local experience be supplemented by better factual information? What can be done to facilitate

wider sharing of available information on community problems? These examples illustrate some central difficulties rooted in extensive change in community living.

This joint arrangement is now under review. The experience is being documented for sharing with a wider public. In the meantime, demand for the Center's specialized advice has exceeded staff resources. For this reason, it is confined largely to professional and voluntary leaders. The Center has no plans for a program of direct consulting service to Saskatchewan communities. Its focus is on the competence of those who already have this responsibility.

Training:

The purpose of the training program is to help professional persons and voluntary leaders better understand the community in which they are working. To that end, the Center has an organized series of conferences, short courses and workshops. The professional staff consists of one adult educator and an anthropologist. The latter is responsible for a contract training program involving the Indian-Metis settlements of the North.

Training professionals who conduct programs in communities assumes that a subject matter exists common to many: the character of the Saskatchewan environment, how adults learn, how adults can get ideas "across" to one another, how they work together, how they organize, and how they can teach through activities.

The Center sponsors annual training programs. One of them involves a short course in continuing education co-sponsored by the University. It also participates in professional courses already established by other agencies or University departments (such as Commerce, Education, Social and Preventive Medicine, Agriculture). For the past two years, the Center staff has taught the University Summer School course for agricultural representatives. One staff member holds a joint appointment in the Center and the Department of Social and Preventive Medicine.

During the past year, interest in the training program has extended beyond Saskatchewan. This reflects a common regional need and the scarcity of specialized training resources. Such international agencies as the Colombo Plan, the United Nations and the International Co-operation Administration have approached the Center for the training of personnel for community development abroad. A special attraction comes from the Center's contrasting work in the underdeveloped communities of the North and the developing communities of the South.

Other Activities

When requested, the Center has undertaken assignments related to its special interests. Assignments in Saskatchewan involve travel at the expense of the sponsors; outside the Province an additional fee may be levied, payable to the Center. Examples of out-of-province assignments include an assessment of agricultural extension in Canada for the National "Resources for Tomorrow" Conference; a presentation to the Senate Land Use Committee on community adaptations and rural development; H.R.H. the Duke of Edinburgh's Second Conference on Man and Industry. The latter involves two days of concentrated study by 300 Commonwealth visitors based on three Center research projects and related experience. It will be co-sponsored by the University, the Saskatchewan Research Council and the Center.

THE SENATE

SPECIAL COMMITTEE ON LAND USE IN CANADA

EVIDENCE

OTTAWA, Thursday, May 4, 1961.

The Special Committee on Land Use in Canada met this day at 11 a.m.
Senator Arthur M. Pearson in the Chair.

The CHAIRMAN: Honourable senators, we have with us this morning Professor Van Vliet of the University of Saskatchewan, Department of Farm Management. He comes from Saskatoon. Professor Van Vliet, will you give us a brief outline of your career and your activities, and how you managed to get the job you have, and other details.

Professor H. VAN VLIET, Department of Farm Management, University of Saskatchewan: Mr. Chairman, it is really hard to say. I am head of the Department of Farm Management of the University of Saskatchewan. I have been there since 1938. I took over when Dr. Hope left.

The CHAIRMAN: What college did you graduate from?

Prof. VAN VLIET: I am a graduate of University of Saskatchewan, where I took my bachelor's and master's degrees, and then I took doctorate studies at Madison, Wisconsin.

The CHAIRMAN: I understand you have no prepared brief except these notes outlining your discussion.

Prof. VAN VLIET: Honourable senators, first of all I would like to express my appreciation for this opportunity of appearing before you and to commend the survey of land use which you have undertaken.

I do want to apologize for being unprepared in my submission. I however have an outline from which I will paraphrase with some references to the tables of statistics which have been distributed.

(See Appendix at pp. 271 to 280)

The CHAIRMAN: Would you allow questions during your delivery?

Prof. VAN VLIET: Yes, at any time.

Mr. Chairman, my subject is essentially land use in western Canada, the prairie provinces. I am going to outline some of the changes in utilization which have occurred, relating them to factors responsible for the changes, and then I am going to outline some of the present aspects of use which suggest needs for further adjustments.

The prairie region, as we call it, ranks in Canadian agriculture because of its sheer bulk. It embraces 75 million of the 100 million acres of crop land in Canada, along with about 25 million of native grassland, so that it is by far the largest single block of agriculture resources in the Canadian area.

In the aggregate the prairie region produces about two-thirds of the total physical output and about one-half the total value output of Canadian agriculture. As a major wheat region it contains all but a half million of the 23 million acres of wheat in Canada and accounts for nearly all the export supply. It also produces nearly all of the Canadian barley crop and practically all of its oil seeds with the exception of soy beans. It accounts for three-quarters

of the oat acreage of Canada so that it supplies about two-thirds of the total feed grain output. Its combined hay and pasture production amounts to about a third of the Canadian total, so that it is responsible for roughly half of the feed production of all kinds. In association with its feed output it accounts for about one-third of the aggregate livestock output, including about one-quarter of the poultry and dairy production, and nearer to one-half of the output of meat animals.

This is not intended to raise a flag on behalf of western Canada, but to indicate the basic interrelation of western agriculture with Canadian agriculture as a whole. Larger problems inherent in national agriculture radiate to an important degree from the position of the Prairie region, and, conversely, if needed adjustments applying to agriculture as a whole redound significantly to the Prairie region.

The Prairie region, while a distinctive region in its major feature of climate and location, it is far from being uniform, and the term "prairie" is in large part a misnomer for the region. Only about one-half the region is prairie in the specific sense and it represents considerably less than half, actually something less than two-fifths, of all the farms in the area. The prairie portion makes up a rough semi-circle above the United States border which takes in the southwestern portion of settled Saskatchewan and the east-central and southeastern parts of settled Alberta. Surrounding the prairie area is a big band of mixed prairie and woodland commonly termed "parkland", which makes the larger part of the agricultural area of Manitoba, a wider band of eastern and northern Saskatchewan, and northern Alberta and a narrower strip of western Alberta. The Parkland, in turn, is fringed by a sizable band of formerly forested area, associated transitional Grey-Black and Gray-Wooded soils, before reaching the non-agricultural forested area to the north and the mountain area to the west. It, therefore, comprises a series of soil-climatic bands radiating out from the central prairie core. Precipitation, in general terms, increases from under 12 inches, in portions of south-eastern Alberta, to 18 or 18½ inches, going north and north-east, and to over 20 inches proceeding eastwards into Manitoba.

The CHAIRMAN: This includes the snowfall?

Prof. VAN VLIET: Yes, this is the total precipitation. At the same time temperatures cool off gradually, and the rainfall distribution becomes somewhat more favourable, so as to give progressively better conditions for crop growth as one goes in a northerly, north-easterly and easterly direction. The growing season shortens some, reaching a near-critical range towards the fringe of settlement, but nevertheless permits favourable growing conditions. Fertility is basically high throughout the zones, with some exception for the Grey-Wooded soils, for which the condition of leaching has tended to lower fertility below that of the Parkland. In general, therefore, there is an increase of productivity through the zones from 70 to 100 per cent, for more nearly comparable soil types.

Senator HORNER: Was there any part of the Peace River country in British Columbia and Alberta which was naturally prairie at one time, or was it all wooded?

Prof. VAN VLIET: Yes, there was a good part of the Parkland which was open prairie at one time. I think they were generally larger areas than exist now. In the last while there has been a considerable invasion of the former prairie, which accounts for some of the draw down in the pasture potential of the Parkland area.

Senator HORNER: After prairie settlement and prairie fires were prevented?

Prof. VAN VLIET: Yes. Prevention of prairie fires probably has been responsible for a good part of the additional competition from trees.

Senator McGRAND: Could you give a short definition of "Parkland"?

Prof. VAN VLIET: It is tall, growing prairie, interspersed with woodland, mostly of poplar and willow. It is mixed prairie and wood land. the first prairie zone is often referred to as the short grass prairie zone, with brown soils; the second prairie zone is an intermediate prairie zone with drak brown soils; the Parkland is tall grass and woodland, with black soils; and the wooded zone is essentially forested with a mixed climax of deciduous and coniferous trees.

Senator HORNER: After the prairie fires were prevented, they grew up in the depressions? The roots had survived the fires, is not that true?

Prof. VAN VLIET: Yes. I believe much of the spread of trees is attributed to root-type propagation.

Senator HORNER: And then when the fires were prevented they grew up. I have watched country that 55 years ago was prairie, but which is now Parkland. That is where the trees grew up naturally, when given a chance, in the depressions, because the roots were still there.

Prof. VAN VLIET: Yes, it is quite noticeable that the Parkland type of growth is gradually invading the prairie zones further.

Senator BARBOUR: Did the trees die out?

Senator HORNER: They were burned off the top with the huge prairie fires which occurred, but the roots remained.

Prof. VAN VLIET: Looking at the utilization of the region, it appears to rest on a group of more basic factors which have determined the historical pattern of utilization, with an outlay of more recent or contemporary forces which have given a recent modification or shift from the earlier pattern.

The basic factors still appear strong. They include: first, the factor of a selective climate which might well be better described as restrictive, although it is restrictive in the sense that it primarily favours small grain, especially wheat. So, it gives wheat a primary adaptation to the area. It is less favourable to coarse grains and still more restrictive to the general range of forage crops. In much of the area wheat still makes a better crop than most other cropping alternatives.

The second basic factor rests in the dominant agricultural character of the region. But with less than one fifth of the total Canadian population and under one sixth of the urban population, there is a limited regional market, so that the area depends largely on outshipment for its main product markets. Allied with this, the long market haul, involves a heavier subtraction of marketing costs which reduces the competitive advantage of alternative products for the region.

The fourth factor recognized is the relatively more severe climatic fluctuation of the area which, combined with accentuated price instability resulting from marketing costs, contributes more disturbance and more uncertainty to production organization than for most other areas.

The fifth factor involves an essentially low productivity, recognizing yields related to extensive summer fallowing, which gives the basis for the generally extensive scale of farms. Among more recent forces in utilization, the advance of mechanization has been an important factor. Being more readily adapted to grain production, it has had the tendency of increasing the economy of grain production and maintaining its advantage despite the more favourable price position of alternatives. Similarly, the advance of general technology associated with mechanization has borne on grain production with earlier and stronger force to produce the same effect. It, in turn, has given the strong output increasing effect, which underlies some of the current supplies pressure.

The other significant recent factor in the utilization pattern has been the strong shifting of individual product markets. In the early forties it began with reduced outlets for wheat due to the wartime situation, with more

favourable outlets for coarse grains and growing favourability of livestock alternatives. After the war the position changed fairly abruptly with an improved outlet for wheat, but with a contraction of some of the larger livestock markets such as bacon, hogs, dairy products, and to a larger extent cattle. Through the early fifties we had a further reversal, with wheat falling back from a high export position, and cattle and hogs both affected heavily by foot and mouth disease, restricting the cattle markets.

Senator BARBOUR: Is there much coarse grain sold by the west to eastern Canada?

Prof. VAN VLIET: Yes; a large part of the coarse grain grows out of the region.

Senator STAMBAUGH: There is another point that should perhaps be mentioned. The land in the west is most suitable for the use of large machinery. There are sufficiently large areas that machinery can be used on every foot of it; whereas, in the rest of Canada the farming areas are not so suitable for the use of large machinery.

Prof. VAN VLIET: Yes, that is significant. For the area as a whole, about 60 per cent of the land is arable. This means that in the general farming area from 70 to 90 per cent of the land in the individual farms is commonly cultivatable.

The bearing of the most recent factors on our utilization has come more largely in terms of a general pressure for division rather than in terms of specific incentives related to particular product opportunities. Earlier shifts of utilization during the wartime and earlier post-war period were mainly a utilization response to changes in advantage of products. In the fifties, however, much of the response was to a growing income pressure which came from two sources; relatively restrictive crop deliveries which meant that operators were searching cash products, and the further pressure on income which arose out of less favourable cost-price relationships.

The pressure showed up in a number of directions. On the one hand it proved the inadequacy of a larger number of our small farm units, leading to the considerable abandonment of farming which shows up in the decrease in the number of farms for the region.

It also took on a less visible form of abandonment in the increased dependence of farms on other sources of income. There has been a very significant swing away from self-sustained and self-supporting farming in western Canada to fairly broad dependence of individual farms on outside sources of income. It has come in a variety of forms—combined operations such as family combinations to get extra economies; operators, working wives and working family members with employment outside of the farm; and combinations of farming with urban businesses or vocations.

The pressure also bore strongly on attempts to expand farm size as the quicker way of overcoming income pressure. It is recognized in western Canada that expansion of the farm size has often been a quicker and easier way of maintaining income than the building up of a further intensity of the operation. This encouraged the developing and improving of land, accounting for the fairly rapid rate of land improvement of the last 15 years, and particularly the expansion taken on by a large number of farms.

The CHAIRMAN: May I ask a question here with respect to this expansion and the trend towards larger farms? I am thinking of one area in Saskatchewan where the farmer was a homesteader and who farmed three-quarters of a section. When he left the farm he had four sons and a son-in-law, and he provided each one of those with a half-section before he left his own farm. He bought and paid for this land. Those sons have now expanded. They now own $8\frac{1}{2}$ sections amongst the five of them, and those $8\frac{1}{2}$ sections are all in a

block in one area. Those sons are all married and they have a number of sons and daughters as well. What happens now? Where do these sons and daughters go?

Prof. VAN VLIET: It reaches a limit. It has been a fairly common thing to see family groups growing up to a point where they take over most of a township, but this movement is now running its limit, and succeeding generations are finding more and more reason for looking outside the farm.

Senator GOLDING: What effect has that had on your population?

Prof. VAN VLIET: In terms of our farm population in the region, we had over 300,000 farms in the middle thirties, and that number decreased to 232,000 as shown by the 1956 census. This is probably an overcount of farms, and I would suggest that with the further decrease since then there are probably less than 200,000 farms at present. We have lost perhaps a third of what was the peak number of farms.

Senator GOLDING: Bigger machines?

Prof. VAN VLIET: Yes, with more big farms. Actually, a larger part of the effect there has come in the middle-area farms. It has combed out smaller-sized farms on the one hand, but a big effect has been that of middle-sized farms going up in number.

The pressure for expansion has resulted in land values moving out of line with income expectations at the present time. Most land is being purchased for expansion purposes so that the existing unit is being used to pay for the expansion, and the value of the expansion portion is out of line with income for the farm as a whole.

This has also meant that a person who already has a fair-sized unit often has the advantage in the purchase of more land. He can pay the price and has had the cash to purchase. He therefore gets first opportunity to expand as against farmers operating smaller farms, so the process has not distributed the gains in farm expansion as uniformly as might have been desired.

Another problem has been that people have been buying land, not just for the income that it will produce, but for the asset values it represents. This, too, results in a less desirable distribution of farm size.

The hectic process of farm expansion has made the occupancy pattern even more complex with scattered units and diverse methods of holding. This poses problems of inefficiency in operation and handicaps to better type-of-farming organization.

Senator HORNER: I cannot agree with you at all that land values are too high. I know of several cases around my community where men have paid for new land after two years of production. Our land is just as productive as some of the land down in Iowa, for instance. Just as much money can be made from it. In Iowa the land sells for \$250 to \$300 an acre compared with \$50 an acre for our land. I recall a man who came up from Iowa to run a farm. He made \$50,000 and sold the farm and went back to Iowa because he wanted his children to be educated in the United States. He came back to visit me later. He had bought land down there at a bargain price of \$250 an acre. I questioned him on what returns he could get. I said, "How do you figure to get interest on your investment in the land?" He was a big Norwegian and he said, "A farmer never gets interest on his investment" and he laughed. So I don't agree with everything you say on that point. On the question of this changeover being too fast for the farmers, I know many cases where men could not handle the machinery. They did not need it but they left their horses to take on the machinery. It was not a matter of the enterprise of the farmers but that of the machine companies. They pressed many farmers in the early days to buy machinery when they would have been better off to wait a few

years before doing so. Our market for much of our feed grain would be no problem at all but we have gone into using oil and gas, leaving a lot of feed grain lying unsold. There would be no question of selling coarse grain if farmers were still using as many horses as they used to. So the whole changeover was really pressed on us by the farm equipment manufacturers whose salesmen did a great job in selling it.

Professor VAN VLIET: I will admit the point in your contention that in the earlier period, more particularly the late run of the war into the earlier fifties, with exceptional yields and higher prices, people paid for land in three to five years. That was a common earlier experience in western agriculture. I do not think you can say that it is realistic for our position of average yields and our present price position. Unless there is some specialized production for which there is a speculative market, farms are not paid for quickly out of their income. There are still some people paying for land fairly quickly but the ordinary person, the average farmer, has a hard time doing it.

The CHAIRMAN: Professor, perhaps you might continue with your brief at this point.

Professor VAN VLIET: Yes, I appreciate that I have departed from it, and I will condense the further material. Looking at a few aspects of utilization, they are summarized in the tables and skipping tables I and II, I will refer here to table III. With respect to the region in general, its position suggests a significant shift to broader utilization, with the particular aspect of moving away from the former heavy dependence on wheat. It has been quite significant in this sense. The shift, however, has not yet been large enough yet to move us away from the generally heavy dependence on grain. Also, the shifts of individual uses in terms of their absolute amounts is less significant when considering the expansion in agricultural capacity which has occurred in the meantime.

Thus table III under the bank of figures for "Prairie region", suggests that there were 45 million acres of improved land in 1921. With extra settlement in the twenties, offset by some abandonment in the early twenties, the acreage of improved land rose to about 60 million acres by the early thirties. With additional settlement in the wooded areas during the thirties, and despite larger abandonment in the prairie areas, it went up by about 5 million acres to 1941 and has since increased by another 10 million acres, to nearly 76 million by 1956. An estimate of clearing and breaking at over 300,000 acres a year since then, suggests an acreage of over 78 million at the present time. Whereas earlier additions of crop land included some of the poorer prairie areas, the lands which have been brought into production more recently are of relatively favourable agricultural potential. Since the beginning of the war, therefore, the agricultural potential has been increased by well above 20 per cent, and perhaps up to 25 per cent. With this change in capacity some of the utilization changes indicated may not be as significant in the absolute sense as first appears.

Turning briefly to utilization related to crop land uses, this is summarized in table IV.

The more reassuring aspect of the changes rests in the drawdown of wheat acreage and the fact that it has been held down reasonably well during the past few years. The figures do not fully indicate the change which has occurred with a reduction from over 26½ million acres in 1949 to 22 to 23 million acres at the present time. It also does not show some of the earlier changes from the high acreage reached just before the war, (nearly 27 million) to the 16 million in

1943 under Wheat Acreage Reduction. However, as a percentage of the improved area, wheat acreage has been reduced from about 40 per cent in the earlier period to about 30 per cent at the present time.

The CHAIRMAN: Why is that?

Professor VAN VLIET: Mostly because of favourable feed grain outlets in eastern Canada.

Senator HORNER: Is rapeseed not a big crop also?

Professor VAN VLIET: Yes; this is indicated in the next bank of figures.

Senator BARBOUR: Of the wheat in storage is there more of it in some grades than others?

Professor VAN VLIET: There is a mixture of grades but the quality is generally favourable. The lower grades have been pretty well worked out of farm storage.

Oil seeds show fairly favourably in utilization changes. Total oil seed acreage has increased from about half a million acres in the twenties to between two and three million in the more recent period. This reflects a return of a large flaxseed production, much of it associated with high building activity. It has been strengthened by the addition of rapeseed as a new oilseed crop, which has occupied highs of up to 600,000 and 700,000 acres in recent years. It also shows the addition of smaller acreages of mustard seed—up to 150,000 acres in individual years—and modest acreages of sunflower seed since the war. In addition Manitoba reports a small acreage of soy beans. On this basis, oil seeds have reached the point where they are using about 4 to 5 per cent of the improved acreage at the present time.

Senator HORNER: Have soy beans been tried out in Saskatchewan?

Professor VAN VLIET: Yes, but efforts have not been successful due to the long growing season required. Experimenting with shorter-season varieties is under way; the difficulty seems to be that of keeping up the oil content.

Dr. BOOTH: Are any soy beans being grown in Manitoba?

Professor VAN VLIET: Yes, the smaller acreages shown, and they seem to be growing them with reasonable success.

The CHAIRMAN: That growing is pretty well being done in the southern part of Manitoba, is it not?

Professor VAN VLIET: Yes, Mr. Chairman, and on selective farms.

One of the more reassuring aspects of utilization is indicated by the next bank of figures relating to tame hay and tame pasture. These indicate a fairly steady increase in tame hay from a third of a million acres in the early twenties to a recent acreage of about $3\frac{3}{4}$ million, which may well be up to 4 million at the present time. Tame pasture acreage has also increased substantially from about three-quarters of a million in 1921 to about 3 million in 1956, and may be at three and a half or $3\frac{3}{4}$ million acres at the present time.

The CHAIRMAN: How does this tame pasture stand up against wild pasture?

Professor VAN VLIET: Very well indeed. In this regard tame pasture utilization is held to be an important need in improved utilization. The usual indication is that tame pasture is able to treble the output from native pasture and it probably can be built up to increase it by four times. "Other crops" utilization indicated does not express too well the utilization in miscellaneous crops. However, it suggests that there is fairly limited utilization in any type of more specialized crop. A larger part of the acreages shown, in turn, is associated with irrigated areas, mainly in southern Alberta.

The more surprising feature of utilization shown is in the last rank, indicating the amount of summer fallow. This use has increased from 11 million acres in 1921 to from 24 to 25 million acres at the present time. In these terms summer fallow has made up a steadily increased proportion of the improved acreage.

Senator GOLDING: In your list of wheats here, why do you put Durum in a category by itself?

Prof. VAN VLIET: To indicate it is a special form of cropping, because the main wheat is of the hard spring type. There is also a little winter wheat in Alberta. Durum has become a fairly significant crop in the last while, and it is shown separately to indicate its importance in comparison with spring wheat.

The reasons for the increase in summer fallow acreage are not all clear. Surface tillage procedures have made summer fallowing cheaper, and have thereby increased its economy. Also, summer fallowing every other year offers extra convenience of operation for large-scale farming, and this has also contributed to its increase. Again, summer fallow is a basic form of crop insurance, of overcoming the main yield hazard, and this has supported extra use. It is also recognized that the yields of stubble crops have not been maintained as favourably as formerly, due possibly to fertility problems, or other factors. There may therefore be a shift in the relative economy of summer fallow and stubble crops underlying the change. But these explanations do not seem to offer a full explanation. The suggestion, therefore, is that some of the acreage represents a reserve or "hold back" of acreage in relation to the problem of delivery. It may therefore comprise a reserve acreage which could come back into crop utilization with more favourable marketing conditions.

Senator BARBOUR: Is there much fertilizer being used in the growing of wheat?

Prof. VAN VLIET: There are strong indications to suggest that people are not fertilizing nearly as much as they should do. In fact, the reactions to fertilizer use appear almost anomalous in individual cases. Operators admit they could get yield increases from fertilizers which would pay them, but because of the need to find cash for fertilizer and storage, they forego it.

The CHAIRMAN: Is not the variation in fertilizer response due to the amount of rainfall in a particular year, and also the quality of the soil?

Prof. VAN VLIET: There apparently is a considerable variation in fertilizer response related to soil, but the bigger variations seem to relate to moisture. Fertilizer response is not too strong in the prairie zone, except on the better soils offering more favourable moisture conditions. But in Park and Wooded areas it is suggested by results to date that there could readily be an average yield increase of from five to seven bushels.

Senator BARBOUR: Would you say there is much use in using fertilizers in the dry season?

Prof. VAN VLIET: In the Park and Wooded areas it would probably still be advantageous. In Saskatchewan trials there has not been a year that has not shown some yield increase from the use of fertilizer. Individual farms have probably experienced situations in which fertilizer has given little or no gain; but, generally, even in the driest year there was a sufficient response to pay for application.

Senator BARBOUR: Do you ever use commercial fertilizers on permanent pastures?

Professor VAN VLIET: It is beginning to be recognized, and pasture fertilization may offer one of the bigger opportunities for yield increases.

Senator HORNER: There may be some alterations in the type, but in my experience in a dry year I got a little more straw but less wheat than I did on unfertilized land. Several of my neighbours tried using it, but through their experience they quit. We have had a thick standing crop that will withstand the hot wind and drought season better than a thin crop, because it has that extra straw and less wheat.

Professor VAN VLIET: That is an interesting observation, because it is one very frequently made by farm operators, yet it has rarely been proven out. Very often operators may not read their results closely enough to be absolutely sure. It could happen occasionally but it would seem to occur less commonly than is usually believed.

Senator BARBOUR: Have you not tried it out on your experimental farm?

Professor VAN VLIET: Yes, and experimental results so far show that there have not been any years, even the driest ones, in the Parkland areas, in which there wasn't some response.

Senator BOIS: What is the normal application of fertilizer?

Professor VAN VLIET: Generally from 20 pounds up to about 80 pounds, with the more common applications in the range from 30 to 60.

Passing to the next table, it indicates some of the features of livestock production associated in utilization changes. The general position of livestock populations shows some gain in the intensity of livestock production, mostly in the more recent period since the war. However, the gain is relatively modest in relation to the change in feed production and total agricultural production over the period. The largest absolute change has been the decrease in the horse population from more than 2.25 million in the earlier period to only about 300,000 at the present time. In contrast cattle show almost a level position from the earlier period in the early 1950's, with a relatively large expansion in the fifties, mainly since 1953.

Senator BARBOUR: Your numbers of milk cows are down.

Professor VAN VLIET: Yes. There has been considerable change; it is not so much a change to fewer dairy cows as a move away from the former dual-purpose type of cattle herd to an essentially beef-type herd. When compared with the horse population, it is observed that the increase in cattle numbers has done little more than to make up the decrease in the horse numbers that have occurred during the period.

Hog numbers have undergone many cyclical ups and downs in numbers not shown by the selected year figures. There has however been an upward trend since the middle 1920's, but the change has been relatively modest. This does not express the occasional large importance of hogs such as in the war-time period.

Sheep production as indicated, is a limited phase of livestock production in the region and has shown a general decline since the middle twenties to about half the former numbers. Numbers of hens and chickens, reflecting poultry production, have shown relatively little change in level since the twenties.

There has been, however, some change in the extent of specialization in poultry production, and the figures indicate some of the addition of poultry meat production which has occurred more recently, particularly in turkey production.

When total livestock numbers are related to the improved acreage the change in the scope of livestock operations does not show up strongly. Although numbers of livestock suggest a small relative increase, the change in intensity has been modest. Also, the change in aggregate numbers has actually been less proportionately than the increase in feed acreage so that a larger proportion of the feed grain crop than formerly is being shipped out of the region.

The figures on the proportion of farms reporting livestock give some indication of the characteristics of livestock organization. About three-quarters of all farms report cattle, somewhere between one-half and two-thirds report hogs, and about three-quarters report poultry. It has been indicated by various other studies that up to 20 to 25 per cent of farms in many areas do not report any livestock. This implies that much of the livestock production is mixed production of several of the main types of livestock. The figures on average numbers suggest that most of the livestock operations involve relatively small-scale enterprises.

Senator HORNER: Sheep and lambs seem to have fallen off. We have not as many as we had years ago?

Professor VAN VLIET: No, they have gone down to about half of their former numbers. Some of that is due to a decrease in range production, but a large part of it is due to the discontinuation of farm sheep production.

Senator HORNER: You are having wonderful success with sheep at the university?

Professor VAN VLIET: Yes, in numbers, but that does not necessarily indicate their economy.

Senator BARBOUR: I suppose it is difficult on account of the fencing needed?

Professor VAN VLIET: Yes, that is true. While there would seem to be room for wider use of sheep as against cattle on many farms, the thought of having to put out \$600 or so per mile for fencing often rules them out.

Senator HORNER: But every farmer could keep a small number of sheep around the yard. They would not damage the grain at all.

Professor VAN VLIET: The problem there is that if a person is going to have sheep at all a small flock doesn't do too much good. A reasonable farm flock should probably have about 200 ewes.

Senator HORNER: But he might as well have lamb to eat.

Professor VAN VLIET: Our people do not seem to like lamb that much. I think most of our lamb eaters have left the scene. Lamb is not a popular meat, and we do not see too much lamb in our meat supplies.

Changes in utilization in the smaller areas of the region are not easy to define. The information in Tables VI, VII, VIII and IX furnishes a general impression of the main area-changes, using an approximation of the principal soil-climatic zones.

Census district figures have been grouped into totals to represent the zones. While this does not give a precise alignment for zones it shows the general differences of utilization which apply.

In Manitoba there are three zones which are called shallow parkland, which takes in the southwestern portion of the province; the deep parkland, running through the middle of the province; and the transitional and wooded area made up by the northern forest fringe, the inter-lake area, and eastern settled area.

Utilization in the main cropland uses shows a decrease for wheat and a substantial increase of coarse grains through these zones. This is what is generally expected, but the differences are hardly as might be expected. Wheat is still a strong use throughout all the zones and the combined use in wheat and coarse grains remains high for all these areas. Oil seeds, as more specialized crops, actually represent a larger use in the more southerly zones where flaxseed and sunflower seeds are important crops. Tame hay and pasture use, while larger for the northern zones, do not show as wide a change as would appear desirable from the standpoint of rotation practice.

Livestock numbers actually show a downward change for the more northern zones of the province.

Table VII, which indicates comparative utilization for soil-climatic zones for Saskatchewan gives a somewhat wider comparison by including the prairie areas of the region. The first area is termed the Short Grass Prairie, which is the drier prairie area. The Tall Prairie is the prairie zone in a more favourable moisture situation, while the Shallow Park and the Deep Park and Wooded areas fall into comparison with similar areas for Manitoba.

For Saskatchewan, wheat utilization decreases from 40 per cent of improved acreage in the Prairie zones but still remains at about 30 per cent for the parkland and wooded zones. The feed grain use increases considerably into the parkland and wooded areas, yet nearly 60 per cent of all cropland in the park and wooded areas remains in wheat and coarse grains. Tame hay increases relatively in the northern zones; however, it remains at less than 3 per cent of improved land for the main park and wooded areas of the province. Similarly tame pasture remains near to 3 per cent throughout the area, with tame pasture use being about as important in most of the prairie areas as in the moister sections.

Summerfallow decreases some in relative importance in the northern zones. The striking feature, however, is the high ratio in the park and wooded areas where summerfallow as a moisture conservation aid is much less essential. In this it suggests an apparent overuse of summerfallow in relation to the remainder of the province.

The position of livestock numbers for soil-climatic zones in Saskatchewan is somewhat surprising. Livestock numbers per farm particularly for cattle, which is the main type of livestock, are higher for the Prairie zones than for the northern zones. While the ratio of livestock to improved land is higher for the northern zones, it is very little higher and suggests a lower development of livestock than would be indicated by its general feed-crop adaptation.

Table VIII, indicating the position for Alberta suggests generally more progress in shift of utilization away from wheat, and also in the development of livestock complements of farms than the other provinces. This is explainable in part by extra bulking of the deep park and wooded areas in the province. Mainly, however, it reflects the market position whereby Alberta enjoys a larger margin of advantage in converting feed crops into livestock for shipment to market. On this basis the province shows a generally higher utilization in feed grains fodder as well as livestock. Livestock numbers per farm are generally higher than for comparative areas of the other provinces for all zones.

With the limits of time, one related aspect of utilization, that concerned with farm holdings, may be mentioned, summarizes sizes of farms in groupings of familiar classes of quartersection (160 acre) sizes. The first two banks show the distribution of farms by size for census periods from 1921 to 1956. The bottom bank relates to 1956 and indicates sizes for the main soil climatic zones

of the region. The 12,000 farms of under one-quarter section size are not significant in so far as they do not qualify generally as commercial farms. However, 42,000 farms in 1956 were one-quarter section units, a large portion of them aspiring to commercial farming. Another 78,000 were only a half section in size, so that over half of all the farms in the region were two quarter-sections or less in size. This indicates a generally heavy lumping of farms in terms of sizes which are precariously small for the region.

The CHAIRMAN: They are mostly in the north-east?

Prof. VAN VLIET: A lot of them are in the north. However, looking at the lower table, it is significant how many are indicated for the more southerly areas. For the short grass prairie areas nearly 6,000 are given as one and two-quarter units; in the tall prairie area over 12,000 fall in this classification. At the same time, four and five-quarter section farms, which are still precarious sizes for the middle and lower qualities of soil, make up a very large proportion of the farms in these areas. Hence, for in the prairie region there are still a large proportion of the farms which do not suggest sufficient income capacity to maintain themselves on the basis of current utilization conditions.

Briefly summarizing some of the aspects of utilization which appear significant, firstly the balance of utilization for the region still remains heavily weighted in terms of wheat.

With the apparent reserve acreage represented by summer fallow and the potentialities for increasing production, utilization will probably press on wheat surplus for some time. It will require a substantial further shift away from wheat for the main park and wooded areas to relieve the tendency to surplus wheat production.

There is reason for concern about the permanence and stability of existing utilization changes. Many of the changes indicated appear to have been introduced under a pressure to divert, rather than in terms of more permanent incentives furnished by alternative production opportunities. In these terms much of the use-change is temporary, and speculative and could readily be reversed by some relief of existing marketing pressures or smaller changes of product opportunities.

Certain elements of undesirable utilization are associated in the present utilization pattern. More particularly, use for a large part of the park and wooded zones, where the position of moisture and fertility is favourable to a more advanced rotational system of cropping incorporating "soil-building" effects of forage utilization, still suggest too much reliance of short-term grain rotation.

The CHAIRMAN: May I interject. On my own farm, which is in a dry area, I have to work on a sort of cyclical basis. I raise quite a bit of flax, but I think I got into it in a wet period and will have to go out of flax again and straight into wheat because wheat will stand pressure more than flax will.

Prof. VAN VLIET: I think that is true for our prairie areas generally. The basis of utilization may need to be a very flexible one not only in terms of the type of crop selected for the year but also in terms of the rates of summer-fallow used. There is an operator in a drier portion of Saskatchewan, who started out in 1941 with a flexible cropping system. Measuring his moisture carefully to estimate the cropping potential for each season he cropped the land continually from 1941 to 1954. For the 14 years, his results from continuous cropping of that acreage were astounding. He was lucky in hitting a generally favourable run of moisture, but we may need to have more of this type of flexible adjustment of cropping to moisture to realize the full potentialities of the prairie region.

There is also a problem of insufficient soil protection and neglect of more basic processes of conservation: Contrary to some popular views, the prairie region is not an area of wholesale "soil mining". It probably is not undergoing any more serious soil destruction than other areas of Canada, and there has been a fair advance of protective utilization in the last while. Beyond further protective management however, there is need for additional use-conversion of some problem soil areas in regard to soil-drifting and an even greater need for more permanent utilization changes to guard against water erosion which is becoming a larger problem in soil maintenance. Farm development in existing utilization also shows a problem of underdevelopment of farming systems, in individual type-of-farming organization. It shows the effect of the buffetting back and forth from one production opportunity to another, whereby farms have not got off the ground in an established and more developed type of farming. This feature is particularly true of the livestock organization of many farms.

Senator BARBOUR: Do you think you will ever arrive in that position?

Prof. VAN VLIET: We hope we may but there can easily be reservations. It is unfortunate that we did not get further along in this direction in the war and post-war period, whereby we might have held more firmly through the recent period. Instead we have stayed in small-scale mixed livestock production, with a lot of "in and outing" for the individual farm.

Senator BARBOUR: When there is a high price for any article like beef or pork or grain the farmers will always provide enough and more than the market can take.

Prof. VAN VLIET: I think your point is well taken, Senator Barbour. The real problem seems to be that the incentive so far has been so narrow, and market prospects so precarious, that producers have not had the certainty to try for fuller development. There appears to be a consideration of getting over a threshold in livestock operation before it gets to become a more permanent and stable part of a farming operation. What we have had instead is small-scale, at-the-margin production which has been far too prone to "in and out" operation. It has not been the kind of livestock production that has given real economy and assistance to the position of the farm. With the above there are certainly deficiencies in individual operation, by way of inefficiencies which are recognized. One of these is the effect of mechanization which has shown up in an excessive overhead of equipment on many farms. In many cases the more evident inefficiencies are related to the larger problem of the inadequate size of the farm unit. It involves a general limitation on efficiency in that the farm is not adequate enough to build in the changes for achieving more efficient operation. And for a substantial proportion of farms it suggests that such farms cannot survive if conditions of costs and prices remain as they are.

Senator HORNER: Another problem you have not touched upon is the very rapid increase in taxes on farmland in Saskatchewan with the prospects of them still going higher.

Prof. VAN VLIET: That is right, and it is aggravating the situation further.

Senator HORNER: Then there is the matter of summerfallow. They do not summerfallow in this part of the country as much as in the west. It is done partly to control weeds. I remember some land I bought in Battleford, in the parkland area. This land that I bought had been homesteaded many years before the turn of the century and I leased it to a real good farmer and he did a

wonderful job of summerfallowing. This 60 acres had grass on it and one year that I looked it over I thought that it was a perfect job of summerfallow. He had kept it black. He then telephoned me in the spring and said that he wanted to summerfallow it again; he said he wanted to get rid of the grass. I told him that I thought that he had got rid of it but he suggested that he summerfallow it again that year and I said that inasmuch as he was renting it he could go ahead and do that. He summerfallowed it for two years in succession, and when he came to take off the crop on that part of the ground which had been summerfallowed for two years he got about 42 bushels to the acre, and where it was summerfallowed only one year he got only 20. So he got two years' crop in one in the two-year summerfallowed ground.

Prof. VAN VLIET: There is a general suggestion that over a long run there may not be too much difference between the output from continuous cropping and one and two-crop summerfallow systems. But it still seems to allow opportunity for flexible cropping systems, adjusted to moisture, to give real gains in the output of crop over a run of years. The point that the weed problem was a significant factor in increasing the amount of summer fallow in the fifties is well taken.

Reference to the adequacy of farm units does not allow an easy indication of the distribution of farms in this regard. In terms of the general basis of utilization allowed, however, and for present price-cost conditions, it commonly requires a gross income for the farm in the general range of \$12,000 to \$15,000 before the net income of the operator suggests a reasonable return for family living and a satisfactory margin for capitalizing the investment.

Senator BARBOUR: What would the net figure be that would be reasonably good?

Prof. VAN VLIET: It would be based on giving the operator about \$3,500 for living, along with his house and produce, and would allow somewhere between \$1,000 to \$1,500 of extra income towards capitalizing the upwards of \$50,000 of investment which would be involved.

Senator BARBOUR: It would not be more than one-third for expenses?

Prof. VAN VLIET: The ratio of the net income to the operator, his take-home pay for his own labour and his own capital investment, ranges generally from 25 to 40 per cent of the gross for the situation represented.

Senator BARBOUR: Senator Horner said a while ago that farmers did not very often get interest on their capital.

Prof. VAN VLIET: That is probably true enough.

Senator GOLDING: You were including somebody else, were you not?

Senator HORNER: Yes, I was.

Senator BARBOUR: It is pretty well true in most cases.

Prof. VAN VLIET: In terms of the income standard indicated, anywhere up to two-fifths of farms would not be able to come anywhere close to the standard, even with relatively high development of the farm and with efficient operation.

Senator HORNER: Take the man on a farm, if he had a home, a good home, compared to a man on a salary who buys a house for \$10,000 or \$15,000, what interest would he get on the house? What interest does the labouring man get on a house that he owns?

Prof. VAN VLIET: I do not quite understand what may be implied. Is it a question of what rate of allowance should be made for a farm home?

Senator HORNER: The farmer has his home on the farm. What interest does the man who has a home in the city get on the investment in his house, other than the fact that he is living in it?

Prof. VAN VLIET: Only his own satisfaction in living in it.

Senator BARBOUR: He does not get out of work so often.

Prof. VAN VLIET: No, not often enough, maybe.

Mr. Chairman, I will not be in a position to round off the subject in time but will conclude with one more particular comment. Considering the general position of utilization and the status of farms for the region, it suggests the problem is more than just a narrow problem of utilization. It appears to be a much bigger problem, in terms of the general adjustment of the industry to give more opportunity for the adjustment and development of efficiency of the individual farm. Considering our reserve of potential, our hidden or latent potential, it seems likely that the production in the region will outrun prospective markets for a good time to come. If it is not in wheat it will be in the other alternatives which will be crowded into surplus by attempted production shifts.

Senator BARBOUR: In most cases, with the increase in the number of high schools and social services, it seems that if our income does increase the taxes take most of the increase away.

Prof. VAN VLIET: Yes, they keep going up, and the increase is aggravated when population is thinned out even further.

The suggestion of the continuing prospect of a surplus position supports the view that the more basic problem is not one of utilization but of having industry relative to market potential. The position of individual farms, in turn, suggest that industry is attempting to support a bigger population than it has the capacity to support, unless it can achieve a bigger market.

From the standpoint of the prairie region, which is concerned with larger residual utilization, this crowding of market gives the feeling that farming is trying to get off the floor by pulling on its bootstraps, with a noose around the neck. Improving utilization and efficiency merely increases output to put the industry in a worse position than before. There seems to be a paramount need for approaching the problem from the opposite direction, by getting more market and more market stability which will accommodate additional efficiency. Forcing efficiency by itself will defeat its own purpose, and many of the things which are being tried to help farming in this situation are for the time being working in the wrong direction. Thus, much of the effort has been concentrated on developing more agriculture potential rather than on market outlets, or the alternative adjustment of supply to the market.

Senator GOLDING: Your problem with respect to farm taxes in Saskatchewan should not be a serious one now, in view of the decline in farm population.

Prof. VAN VLIET: It is serious in the sense that our service costs on a per capita basis are normally high because of sparse population, and the more the population is thinned the higher school costs and other costs go.

Senator GOLDING: But on the other hand you have fewer children to go to school, and your farms are getting bigger.

Senator BARBOUR: Perhaps they go to school at different places.

The CHAIRMAN: The total number of children going to school is greater now than it ever was.

Senator GOLDING: Despite the reduction in population?

The CHAIRMAN: Yes.

Pro. VAN VLIET: In regard to the school population more particularly, the population surge after the war is now bringing a big lumping of children in the school ages. School population at the moment is going ahead faster than at any time in our history: that applies particularly to urban areas, but also to many rural areas as well.

The CHAIRMAN: Dr. Booth, have you any questions to ask?

Dr. BOOTH: No, thank you.

Senator GOLDING: Mr. Chairman, may I move a vote of thanks to Professor Van Vliet for the very informative talk he has given us.

Prof. VAN VLIET: Thank you, senators.

The Committee adjourned.

APPENDIX

TABLE I

COMPARATIVE STATISTICS FOR CANADIAN AGRICULTURAL REGIONS

	Prairie region	Central region	Atlantic region	British Columbia	All Canada
Populations					
	(1956—thousands)				
Total population.....	2,885	10,033	1,764	1,399	16,081
Urban.....	1,468	7,344	869	1,034	10,715
Rural.....	1,385	2,690	895	396	5,366
Farm.....	901	1,449	284	113	2,747
No. occupied farms.....	232	263	55	25	575
Farm Areas					
	(1956—thousands acres)				
Total occupied.....	126,696	35,790	6,894	4,539	173,924
Improved.....	75,706	21,202	2,251	1,167	100,326
Unimproved.....	50,990	14,588	4,643	3,372	73,597
Crop Acreages					
	(1959—thousands acres)				
Wheat.....	22,557	455	6	47	23,064
Feed grains.....	16,518	4,746	341	147	21,751
Tame hay.....	3,709	6,808	888	374	11,779
Tame pasture (1956).....	2,195	6,113	621	320	10,058
Oilseeds.....	2,711	260	—	12	2,982
Livestock Numbers					
	(1959—thousands head)				
Horses.....	312	250	39	23	624
All cattle.....	5,303	4,970	427	420	11,120
Milk cows.....	734	2,098	185	91	3,108
Sheep and lambs.....	795	692	177	97	1,761
Hogs.....	3,130	3,490	184	68	6,872
Hens and chickens.....	24,690	40,000	4,020	4,800	73,510
Farm Product Income					
	(Average 1956-59—thousands dollars)				
Crops.....	701,341	244,297	27,706	33,282	1,006,626
Meat animals.....	365,678	441,151	26,976	21,856	855,661
Dairy products.....	87,102	325,958	28,717	33,911	475,688
Poultry products.....	64,609	163,833	19,815	25,269	273,526
All products.....	1,239,242	1,234,425	115,498	119,608	2,708,773

TABLE II
SELECTED INDEXES OF FARM PRICES AND COSTS

A. PRICES OF FARM PRODUCTS

	Canada	Ontario	Manitoba	Sask.	Alberta
1935-39 Average.....	100.0	100.0	100.0	100.0	100.0
1940.....	96.8	104.2	92.8	86.5	90.6
1945.....	185.7	174.6	188.4	192.6	196.2
1950.....	260.8	265.1	274.4	251.5	276.2
1955.....	232.7	249.2	225.6	203.5	223.2
1956.....	234.6	250.5	227.0	208.5	224.0
1957.....	234.2	255.4	222.4	201.6	223.6
1958.....	245.5	266.5	236.6	214.5	236.4
1959.....	245.2	264.2	237.3	213.9	235.3
1960.....	239.4	265.0	224.5	200.8	217.0

B. COSTS OF GOODS AND SERVICES USED BY FARMERS

	Canada	Eastern	Western
1935-39 Average.....	100.0	100.0	100.0
1940.....	107.6	108.1	107.0
1945.....	140.6	142.6	138.6
1950.....	197.3	198.5	196.1
1955.....	224.5	225.8	223.2
1956.....	230.3	231.9	228.8
1957.....	238.6	240.6	236.5
1958.....	242.7	243.7	241.9
1959.....	249.4	251.3	247.6
1960.....	253.6	255.5	251.6

C. RELATIVE PURCHASING POWER OF PRODUCT PRICES

	Canada	Ontario	Sask.
1935-39 Average.....	100.0	100.0	100.0
1940.....	90.0	96.3	80.8
1945.....	132.0	122.4	139.0
1950.....	132.2	133.6	128.3
1955.....	103.7	110.4	91.2
1956.....	101.9	108.0	91.1
1957.....	98.2	106.2	85.2
1958.....	100.7	109.4	88.7
1959.....	98.3	105.1	86.4
1960.....	94.4	103.7	79.8

TABLE III
CHANGES IN AREA AND CONDITION OF OCCUPIED FARM LAND,
PRAIRIE REGION, 1921 TO 1956

(Thousands acres)

	1921	1926	1931	1936	1941	1946	1951	1956
Manitoba								
Occupied Area.....	14,616	14,412	15,131	15,669	16,891	16,671	17,731	17,932
Improved.....	8,058	8,346	8,521	8,855	9,829	9,773	10,762	11,454
Unimproved.....	6,558	6,066	6,610	6,814	7,062	6,898	6,969	6,478
% improved.....	55.1	57.9	56.3	56.5	58.1	58.6	60.6	63.8
Saskatchewan								
Occupied Area.....	44,023	45,945	55,673	56,905	59,961	59,416	61,663	62,794
Improved.....	25,037	27,714	33,549	33,632	35,577	35,590	38,807	40,506
Unimproved.....	18,986	18,231	22,124	23,273	24,384	23,826	22,856	22,288
% improved.....	56.8	60.3	60.2	59.1	59.3	59.9	62.9	64.5
Alberta								
Occupied Area.....	29,293	28,573	38,978	40,540	43,277	41,452	44,460	45,970
Improved.....	11,768	13,204	17,749	18,363	20,125	20,032	22,271	23,746
Unimproved.....	17,525	15,369	21,229	22,177	23,152	21,420	22,189	22,224
% improved.....	40.1	26.2	45.5	45.2	46.5	48.3	50.0	51.6
Prairie Region								
Occupied Area.....	87,932	88,930	109,783	113,113	120,130	117,538	123,854	126,696
Improved.....	44,864	49,265	59,820	60,850	65,532	65,395	71,840	75,706
Unimproved.....	43,068	39,665	49,963	52,263	54,598	52,143	52,014	50,990
% improved.....	51.0	55.3	54.4	53.7	54.5	55.6	58.0	59.7

TABLE IV
CHANGES IN PRINCIPAL CROPLAND USES, PRAIRIE REGION, 1921 TO 1959

	1921	1931	1941	1946	1951	1956	1959
	(Thousands acres)						
Improved Area.....	44,863	59,918	65,532	65,395	71,840	75,706	—
All Wheat.....	19,390	25,586	21,216	23,361	24,385	22,063	22,557
Spring.....	19,308	24,460	20,971	22,641	23,712	20,498	21,539
Fall.....	{ 82 }	42	26	213	70	52	—
Durum.....		1,084	219	507	602	1,522	1,018
Wheat, % of imp. area.....	43.2	42.7	32.4	35.7	33.9	29.1	—
All Rye.....	659	733	844	643	1,047	452	435
Spring.....	{ 659 }	176	226	220	416	179	111
Fall.....		557	618	422	631	273	324
Rye, % of imp. area.....	1.5	1.2	1.3	1.0	1.5	0.6	—
Total Feed Grains.....	10,852	11,549	13,137	14,319	16,018	17,216	16,518
Oats.....	9,199	8,279	8,203	8,470	8,312	8,657	7,882
Barley.....	1,634	3,214	4,779	5,788	7,530	8,181	8,107
Mixed grains.....	12	49	69	48	142	306	495
Corn for grain.....	5	3	86	14	26	9	9
Buckwheat.....	1	4	—	—	8	64	25
Feed grains, % of imp. area....	24.2	19.3	20.0	21.9	22.3	22.7	—
Total Oil Seeds.....	457	641	994	869	1,156	3,507	2,711
Flax seed.....	457	641	994	822	1,086	3,010	2,368
Rape seed.....	—	—	—	24	7	352	217
Mustard seed.....	—	—	—	—	41	108	80
Sunflower seed.....	—	—	—	23	22	34	42
Soybeans.....	—	—	—	—	—	—	3
Oil seeds, % of imp. area.....	1.0	1.1	1.5	1.3	1.5	4.6	—
Fodder Crops.....	749	1,382	2,001	2,274	2,690	2,992	—
Tame hay.....	314	766	1,445	1,650	2,177	2,313	3,709
Corn for fodder.....	14	15	47	22	20	24	31
Other fodder.....	418	583	463	558	492	653	—
Field roots.....	3	17	46	43	1	3	—
Tame hay, % of imp. area.....	0.7	1.3	2.2	2.5	3.0	3.1	—
Tame Pasture.....	790	1,649	1,865	2,068	3,139	3,003	—
% of imp. area.....	1.8	2.8	2.8	3.2	4.4	4.0	—
Other Crops.....	98	131	108	208	202	168	—
Field peas.....	3	1	8	57	24	71	48
Field beans.....	0.1	1	2	1	—	1	—
Potatoes.....	94	117	94	78	49	32	53
Sugar beets.....	—	12	—	—	55	61	53
Other.....	—	—	4	72	73	4	—
Other crops, % of imp. area....	0.2	0.2	0.3	0.3	0.2	0.2	—
Summerfallow.....	11,275	16,558	23,116	20,399	21,570	24,112	24,378
% of imp. area.....	25.1	27.6	35.3	31.2	30.0	31.8	—

TABLE V
CHANGES IN LIVESTOCK POPULATIONS, PRAIRIE REGION, 1921 TO 1959

	1921	1931	1941	1946	1951	1956	1959
(Thousands)							
Occupied Farms.....	256	288	296	270	249	232	—
Improved acres.....	44,863	59,918	65,532	65,395	71,840	75,706	—
Livestock Population (Thousands head)							
Horses.....	2,240	2,054	1,752	1,255	696	400	312
Milk cows.....	1,022	1,199	1,108	1,002	803	777	734
Beef cows.....	—	—	364	642	784	—	—
All cattle.....	3,325	2,982	3,289	3,900	3,509	5,190	5,303
Sheep and lambs.....	739	1,284	1,251	1,207	532	621	795
Hogs.....	1,043	2,391	3,153	1,771	1,802	2,114	3,130
Hens and chickens.....	15,623	22,212	23,432	26,765	23,393	23,652	24,690
Turkeys.....	566	1,575	2,249	1,517	1,106	2,257	—
Other poultry.....	306	560	501	469	337	405	—
Farms Reporting Livestock (Percent of all farms)							
Cattle.....	81.6	72.6	79.1	78.8	77.6	76.5	—
Sheep.....	6.0	5.8	7.8	8.0	4.8	5.2	—
Hogs.....	55.4	58.4	65.7	54.1	56.8	51.7	—
Hens and chickens.....	78.2*	76.6*	—	70.5	70.4	67.1	—
Numbers per Farm (Average per farm reporting)							
Milk cows.....	—	—	4.9	5.0	4.6	5.2	—
All cattle.....	—	—	14.0	18.4	18.2	29.2	—
Sheep and lambs.....	48.5	76.7	54.2	55.6	44.7	51.4	—
Hogs.....	7.4	14.2	16.2	12.1	12.8	17.6	—
Hens and chickens.....	82.6*	114.9*	—	140.7	133.7	152.0	—
Ratio of Numbers (Average Numbers per 100 improved acres)							
Milk cows.....	—	—	1.7	1.5	1.1	1.0	—
Beef cows.....	—	—	0.6	1.0	1.1	—	—
All cattle.....	7.4	5.0	5.0	5.9	4.9	6.9	—
Sheep and lambs.....	1.6	2.1	1.9	1.8	0.7	0.8	—
Hogs.....	2.3	4.0	4.8	2.7	2.5	2.8	—
Hens and chickens.....	34.8*	38.8*	35.7	40.9	32.6	31.2	—

* All poultry.

TABLE VI
COMPARATIVE UTILIZATION BY MAIN SOIL-CLIMATIC ZONES, 1956
MANITOBA

	Shallow Park		Deep Park		Transitional and Wooded		Province	
	1946	1956	1946	1956	1946	1956	1946	1956
Occupied farms.....	8,650	8,141	22,713	20,449	23,085	20,611	54,448	49,201
				(Thousands)				
Improved acres.....	2,561	2,828	4,861	5,509	2,350	3,116	9,773	11,454
1956								
	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area
Cropland Uses								
Wheat.....	618	22.0	1,109	20.1	470	15.1	2,199	19.2
Feed grains.....	771	27.3	1,817	32.9	1,146	36.0	3,736	32.6
Oil seeds.....	304	10.9	460	8.3	89	2.8	854	7.5
Tame hay.....	94	3.3	259	4.7	264	8.4	634	5.5
Tame pasture.....	93	3.3	278	5.0	222	7.1	594	5.2
Other crops.....	45	1.6	161	2.9	72	2.3	261	2.3
Summerfallow.....	835	29.6	1,271	23.0	720	23.1	2,827	24.7
	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing
Livestock Numbers								
Horses.....	.6	2.8	.5	2.5	1.0	2.6	.6	2.6
Milk cows.....	1.1	5.8	1.6	7.0	3.4	6.9	1.9	6.4
All cattle.....	7.4	30.8	6.2	21.6	10.3	19.5	7.6	22.3
Sheep.....	.5	46.1	.5	36.1	1.1	26.1	.6	31.7
Swine.....	2.3	11.3	2.6	14.3	3.1	8.4	2.7	12.0
Chickens.....	28.5	148.2	56.2	229.0	67.0	148.0	52.3	181.0

TABLE VII
COMPARATIVE UTILIZATION BY MAIN SOIL-CLIMATIC ZONES, 1956

SASKATCHEWAN

	Short Grass Prairie		Tall Prairie		Shallow Park		Deep Park and Wooded	
	1946	1956	1946	1956	1946	1956	1946	1956
Occupied Farms.....	26,980	20,309	33,370	27,425	33,289	28,814	31,973	26,843
				(Thousands)				
Improved Acres.....	10,366	11,133	12,387	12,739	7,413	8,863	5,423	6,839
1956								
	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area
Cropland Uses—								
Wheat.....	4,761	42.0	5,338	41.9	2,519	28.4	1,949	28.5
Feed grains.....	896	8.1	1,755	13.8	2,215	25.0	1,882	26.6
Oil seeds.....	650	5.8	759	6.0	360	4.1	237	3.5
Tame Hay.....	105	1.0	147	1.2	213	2.4	181	2.7
Tame pasture.....	268	2.4	388	3.0	269	3.0	201	3.0
Misc. crops.....	110	9.8	128	1.0	147	1.7	87	1.4
Summerfallow.....	4,161	37.4	4,960	38.9	2,930	33.1	2,140	31.3
	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing
Livestock Numbers—								
Horses.....	.2	3.3	.3	2.9	.7	3.3	.6	2.5
Milk cows.....	.2	3.8	.5	4.7	1.1	5.0	1.4	4.9
All cattle.....	4.5	38.9	3.7	25.4	6.8	25.8	4.4	14.7
Sheep.....	.5	110.7	.1	34.1	.5	31.0	.4	15.2
Swine.....	.6	10.8	1.1	12.6	1.8	10.9	3.1	13.8
Chickens.....	12.0	114.9	18.5	126.3	25.5	113.6	26.6	98.8

TABLE VIII
COMPARATIVE UTILIZATION BY MAIN SOIL-CLIMATIC ZONES, 1956

ALBERTA

	Short Grass Prairie		Tall Prairie		Shallow Park		Deep Park and Wooded	
	1946	1956	1946	1956	1946	1956	1946	1956
Occupied Farms.....	7,571	4,575	13,785	15,363	19,730	19,269	42,145	40,217
Improved Acres.....	3,330	2,701	4,352	(Thousands) 7,316	5,192	5,898	6,044	7,831
1956								
	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area
Cropland Uses								
Wheat.....	978	36.2	2,318	31.7	1,209	20.5	790	10.1
Feed grains.....	272	10.1	1,172	16.0	1,874	31.8	3,412	43.6
Oil seeds.....	153	5.7	257	3.5	73	1.3	160	2.1
Tame hay.....	107	4.0	264	3.6	387	6.6	854	10.9
Tame pasture.....	106	4.0	341	4.7	338	5.7	493	6.3
Misc. crops.....	52	1.9	151	2.1	167	2.8	194	2.5
Summerfallow.....	985	36.5	2,709	37.0	1,719	29.2	1,677	21.4
	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing
Livestock Numbers								
Horses.....	.5	5.3	.4	3.8	.8	4.0	.9	3.2
Milk cows.....	.3	3.7	.6	4.3	1.3	5.7	2.0	6.5
All cattle.....	11.8	89.0	8.5	50.8	13.3	47.3	9.3	23.4
Sheep.....	2.5	254.4	1.5	127.0	2.4	93.3	1.3	30.5
Swine.....	1.0	14.5	3.1	28.2	5.8	29.1	7.9	25.7
Chickens.....	15.2	132.0	26.4	180.9	49.2	203.6	53.7	155.3

TABLE IX
COMPARATIVE UTILIZATION BY MAIN SOIL-CLIMATIC ZONES, 1956

PRAIRIE REGION

	Short Grass Prairie		Tall Prairie		Shallow Park		Deep Park, Wooded and Transitional	
Occupied Farms.....	20,884		42,788		56,224		108,120	
			(Thousands)					
Improved Acreage.....	13,834		20,056		17,589		23,295	
					1956			
	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area	Acres (000's)	% of imp. area
Cropland Uses								
Wheat.....	5,739	41.4	7,656	38.1	4,348	24.7	4,319	18.5
Feed grains.....	1,168	8.4	2,927	14.5	4,860	27.6	8,257	35.4
Oil seeds.....	804	5.8	1,015	5.0	733	4.1	947	4.0
Tame hay.....	213	1.5	312	1.5	695	3.9	1,558	6.6
Tame pasture.....	373	2.6	730	3.6	701	3.9	1,195	5.1
Misc. crops.....	162	1.1	280	1.3	360	2.0	514	2.2
Summerfallow.....	5,147	37.2	7,669	38.2	5,486	31.1	5,808	24.9
	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing	Per 100 imp. acres	Per farm report- ing
Livestock Numbers								
Horses.....	.3	1.2	.4	3.2	.7	3.4	.7	2.8
Milk cows.....	.2	3.8	.5	4.5	1.2	5.3	1.9	6.2
All cattle.....	5.9	50.0	5.5	35.3	8.1	34.1	7.2	20.6
Sheep.....	.9	155.0	.6	96.0	.9	78.1	.8	26.9
Swine.....	.7	11.7	1.8	19.4	3.3	17.9	4.6	16.1
Chickens.....	12.7	113.1	21.3	153.1	33.9	150.8	48.1	153.6

TABLE X
FARM HOLDINGS BY CENSUS PERIODS, PRAIRIE REGION, 1921 TO 1956

	1921		1931		1941			
	No.	% of total	No.	% of total	No.	% of total		
No. of Quarters								
Under one.....	10,041	3.9	15,738	5.5	18,526	6.2		
One.....	95,033	37.2	99,956	34.7	96,170	32.4		
Two.....	150,583	58.9	93,371	32.4	95,302	32.1		
Three.....	↓	↓	33,537	11.6	35,970	12.1		
Four and five.....	↓	↓	31,195	10.8	32,806	11.1		
Six and seven.....	↓	↓	14,282	5.0	9,555	3.2		
Eight-fourteen.....	↓	↓	↓	↓	8,140	2.7		
Over fourteen.....	↓	↓	↓	↓	↓	—		
All farms.....	255,657	100.0	288,079	100.000	296,469	100.0		
	1946		1951		1956			
	No.	% of total	No.	% of total	No.	% of total		
No. of Quarters								
Under one.....	15,638	5.8	14,314	5.8	12,214	5.3		
One.....	74,306	27.6	52,787	21.2	41,914	18.1		
Two.....	91,029	33.8	85,488	34.4	78,004	33.6		
Three.....	35,381	13.1	36,506	14.7	35,565	15.3		
Four and five.....	34,371	12.7	35,909	14.4	37,602	16.2		
Six and seven.....	10,225	4.0	12,281	4.9	13,417	5.8		
Eight-fourteen.....	8,651	3.2	8,508	3.4	9,762	4.2		
Over fourteen.....	↓	—	2,923	1.2	3,538	1.5		
All farms.....	269,601	100.0	248,716	100.0	232,016	100.0		
	Short Grass Prairie		Tall Prairie		Shallow Park		Deep Park and Wooded	
	No.	% of total	No.	% of total	No.	% of total	No.	% of total
No. of Quarters								
Under one.....	212	0.9	819	1.9	1,518	2.7	6,247	5.8
One.....	1,497	6.0	4,565	10.7	8,950	15.9	32,899	30.4
Two.....	4,185	16.8	8,612	20.1	15,910	28.3	34,982	32.4
Three.....	3,650	14.7	7,493	17.5	11,286	20.1	17,496	16.2
Four.....	4,128	16.6	7,633	17.8	8,629	15.3	9,206	8.5
Five-six.....	4,789	19.2	7,435	17.4	6,291	11.2	5,306	4.9
Seven-nine.....	3,119	12.5	3,804	8.9	2,404	4.3	1,416	1.3
Ten-thirteen.....	1,472	5.9	1,425	3.3	733	1.3	372	0.3
Fourteen and over.....	1,832	7.4	1,002	2.3	508	0.9	196	0.2
All farms.....	24,884	100.0	42,788	100.0	56,224	100.0	108,120	100.0



Fourth Session—Twenty-fourth Parliament
1960-61

THE SENATE OF CANADA

PROCEEDINGS OF

THE SPECIAL COMMITTEE OF THE SENATE

ON

LAND USE IN CANADA

No. 10

THURSDAY, MAY 11, 1961

The Honourable Arthur M. Pearson, Chairman
The Honourable Henri C. Bois, Deputy Chairman

WITNESS:

Mr. A. H. Richardson, Chief Conservation Engineer, Ontario Department
of Commerce and Development.

APPENDIX:

Brief from the Ontario Department of Commerce and Development.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961



SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Higgins	Power
Basha	Horner	Smith (<i>Kamloops</i>)
Bois	Inman	Stambaugh
Boucher	Leger	Taylor (<i>Norfolk</i>)
Bradette	Leonard	Taylor (<i>Westmorland</i>)
Buchanan	MacDonald	Turgeon
Cameron	McDonald	Vaillancourt
Crerar	McGrand	Wall
Emerson	Méthot	White—31.
Gladstone	Molson	
Golding	Pearson	

(Quorum 5)

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

"The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Bois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—

Resolved in the affirmative."

J. F. MacNEILL,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

THURSDAY, May 11, 1961.

Pursuant to adjournment and notice the Special Committee of the Senate on Land Use in Canada met this day at 11.00 a.m.

Present: The Honourable Senators:—Pearson, *Chairman*; Barbour, Basha, Boucher, Gladstone, Golding, Horner, Inman, McGrand, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*) and Turgeon.

In attendance: Mr. Ralph A. Stutt, Special Consultant to the Committee; and the Official Reporters of the Senate.

Mr. A. H. Richardson, Chief Conservation Engineer, Ontario Department of Commerce and Development, was heard, questioned and presented a Brief which was ordered to be printed as an Appendix to today's proceedings.

At 12.30 p.m. the Committee adjourned to the call of the Chairman.

Attest.

James D. MacDonald,
Clerk of the Committee.

THE SENATE
SPECIAL COMMITTEE ON LAND USE IN CANADA
EVIDENCE

OTTAWA, Thursday, May 11, 1961.

The Special Committee on Land Use met this day at 11.00 a.m.

Senator Arthur M. Pearson (Chairman) in the Chair.

The CHAIRMAN: Honourable senators, it is just after 11 o'clock, and we have a quorum. We are very pleased to have with us this morning Mr. A. H. Richardson. Mr. Richardson is Chief Conservation Engineer, Department of Commerce and Development, Province of Ontario. We have with us as one of our guests this morning, Mr. H. K. Scott, who comes from Alberta. He is employed in Ottawa with the Department of Agriculture, Economics Division, and has been with the federal Government for some time.

We also have with us Mr. Fujio Nozumi, who is from Japan. He is Research Secretary, Committee on Communications, House of Councillors, the National Diet of Japan. He is here as a visitor and wants to see just what we are doing.

The document which is now being distributed, honourable senators, is a summary of the large brief which you have. Is it your wish to have the large brief printed as an appendix to today's proceedings? It might be of interest to those who receive the reports of the proceedings of this committee.

Senator STAMBAUGH: I notice that there are many pictures, and the brief is not as large as I first thought.

The CHAIRMAN: Yes, the pictures will not be reproduced.

For text of brief presented by Ontario Department of Commerce and Development, Conservation Branch, see Appendix p. 298.

Mr. A. H. Richardson, Chief Conservation Engineer, Department of Commerce and Development, Province of Ontario: Mr. Chairman and honourable senators: Conservation has long been a subject of concern to the people of Ontario. This concern had to do originally with the protection of forests because of their importance as a source of revenue; but allied with this were the problems of wildlife management and the protection of source areas of rivers and streams. In Southern Ontario interest in conservation was indicated first by reforestation and woodlot management, but more recently this has broadened out to include flood control and water conservation, improved land use and recreation areas.

While the progress in these activities has been steady up to the present, most of the programs heretofore were initiated by government departments. Recently, however, there has been a growing conception of personal obligation, especially where land use problems, farm ponds and small reforestation projects are concerned. On the other hand, control of flooding and increased summer flow and large reforestation projects have come to be considered the responsibility of the community—the community, in this case, being the river valley or the watershed drained by a river and its tributaries.

With the advent of this new concept of personal and community responsibility in conservation, the Authorities movement was born, and the willingness of our people to undertake conservation in this way is indicated by the rapid progress made in establishing Authorities in the last fourteen years.

The Conservation Branch of the Ontario Department of Commerce and Development—the chairman mentioned the name of the Department as it was up until Christmas last, but the present name of the department is now the Department of Commerce and Development of the province of Ontario—was established in 1944 and was charged with organizing conservation work in Southern Ontario on the basis of drainage basins, with all the municipalities contained therein as equal partners.

From the terms of the Act which established this department and the scope of work envisaged for the Conservation Branch, as embodied in The Conservation Authorities Act, it is evident that the field of conservation assigned to it is confined very definitely to working with the municipalities after they decide to carry out a conservation program within their watersheds. The Branch is therefore primarily a planning and co-ordinating arm of the Ontario Government. This must be made very clear, because there are four other departments of this government engaged in conservation activities which deal with specific phases of our natural resources.

The large forest empire in Northern Ontario, with its problems of timber management, fire protection, reforestation, forest research, fish and wildlife, recreation and allied problems, is administered by the Department of Lands and Forests. Matters dealing with soil management and drainage, farm planning, crop improvement and a multitude of other problems which are the concern of the farmers of this province are administered by the Department of Agriculture. The building of dams in the hinterland of the north—that is, northern Ontario—to maintain lake levels and regulate summer flow is the responsibility of the Department of Public Works. And the most recently established group, the Ontario Water Resources Commission of the Department of Municipal Affairs, has wide powers in the study and control of water problems and is concerned at the present time very actively with sewage disposal problems and municipal water supplies.

Considering the scope of conservation covered by these four departments—and some of them are quite large, Lands and Forests, for example, including permanent and seasonal help has a staff of 4,200—one may reasonably wonder why the Government of Ontario as recently as sixteen years ago in its wisdom decided to establish still another department to plan and co-ordinate conservation schemes. The answer is that this was an entirely new approach in conservation activities directed to assist the municipalities primarily in Southern Ontario.

THE CONSERVATION AUTHORITIES ACT

The Conservation Authorities Act was passed by the Legislature in the spring of 1946. It required that all municipalities in a watershed—cities, towns, villages and townships (not counties)—be included in the body corporate.

The first step in establishing a Conservation Authority is undertaken by all the municipalities wholly or partly within a watershed. Two such municipalities must first by resolution petition the Minister of Commerce and Development to call a meeting for the purpose of ascertaining whether or not it is desirable that an Authority should be established. Two-thirds of the number of representatives which the municipalities are entitled to appoint (on a population basis) must be present to make the meeting legal. If two-thirds of those present vote in favour, a resolution is forwarded to the Minister requesting that an Authority be established. The Authority is then made legal by an Order-in-Council and under the Act becomes a body corporate with representatives from all the municipalities in the watershed, including those, if any, which voted against its establishment.

Thus from the above it will be seen that the establishing of a Conservation Authority is a simple legal matter. At the preliminary meeting the presiding officer is a senior civil servant, who together with a secretary chosen at the meeting forwards a report with the resolution to the Minister of the Crown. In some cases small adjustments have been made in the area under consideration before the Order-in-Council is presented for approval, but since the inception of the work not one request for establishing an Authority has been refused.

The number of Authorities, including a Conservation Commission, which was formed before 1946, is 30. The area covered is 19,671 square miles; the number of municipalities 434, and the total membership 695.

Senator STAMBAUGH: Why would the total membership be different from the total number of municipalities?

Mr. RICHARDSON: Some of the watersheds overlap and some townships may be within two authorities.

The Authorities vary greatly in size, from the smallest with an area of 86 square miles and 8 members to the largest with 2,614 square miles and 78 members—that is the Grand—the length of the smaller one being 20 miles and the largest one 118 miles.

The Conservation Report

While most of the early Authorities were brought into being because of flooding, all were aware of the necessity of carrying out such supplementary measures as improved methods of land use, reforestation, proper woodlot management, prevention of pollution, investigation of underground water supplies, fish and wildlife studies and recreation. But the Authorities were not equipped to carry out the extensive investigations that would indicate where such work should be done. Consequently the Conservation Branch of the Department of Commerce and development undertook to carry out, at no expense to the Authority, preliminary investigations as a service to the Authorities, to appraise, by means of surveys and reports the conservation needs of each watershed and to submit to the Authority a detailed report outlining the conservation measures that should be followed.

These reports are in the form of a working plan, and are intended primarily for the Authority members. On large watersheds they run to 600 pages, 100 maps and charts, 150 illustrations, and contain as many as 75 recommendations. In addition to the full report, a summary of this in printed form is sometimes issued for general distribution.

The survey work which is written into the report is grouped under six general headings: History, Land Use, Forestry, Water, Wildlife and Recreation. The scope of the studies made in each of these subjects varies with the condition and needs of the area under investigation, with the result that in the completed report the findings recorded are directly related to the major problems to be solved.

History:

A certain amount of historical matter is used in each report as a starting point for the study. An attempt is made to get as true and localized a picture of past conditions as possible. Experience has shown that this historical approach is of great interest to the people of regions dealt with. It often serves to promote an interest in conservation among people who would otherwise remain indifferent. In other words, it is a sort of sugar coating on the pill.

Land Use:

The approach to this subject is on a watershed basis and the relations between soil, agriculture, forestry and water are carefully considered. All existing data, of which there is a considerable amount, are heavily drawn

upon in preparing the report, most important of which are the excellent soil surveys carried out over the last 24 years by the Soils Department of the Ontario Agricultural College in co-operation with the Experimental Farms Service, Canada, and the basis work in physiography by Chapman and Putnam of the Ontario Research Foundation.

Forestry:

The forestry report provides information regarding the condition and extent of the original forest, the sequence of wood-using industries, forest products and their yields, and conservation measures in progress on the watershed at the time of the survey, together with recommendations for future conservation measures.

Water:

Water problems begin in the office with a careful examination of all available data. Hydrometric and meteorological records kept over the years are checked and tabulated, and all available flood records are investigated and related to the gauge records of the river in question, after which the number, size and location of reservoirs required to control floods and regulate summer flow are determined. All small lakes, community ponds and old mill dams are mapped and examined.

Wildlife:

Wildlife surveys include general inventories of all species of wildlife, both game and non-game, and special emphasis is laid on vanishing or threatened species. Streams are classified as to their condition and suitability for particular species of fish.

Recreation:

Recreation surveys include estimates of the present and future population of the area served, descriptions of the present use of all recreation facilities by local and outside residents, rating of all recreation facilities—publicly or privately owned—and recommendations for new recreation areas for both the urban and rural population of the watershed.

INITIATION OF A SCHEME

When the report is presented, the authority must assume responsibility for initiating the schemes which it considers most urgent; it must also make approaches to the government departments or other bodies from which it hopes to get assistance, either financial or otherwise.

If, for example, a scheme undertaken by an Authority has to do with land use, it must seek assistance from the Ontario Department of Agriculture, which maintains agricultural representatives in all the counties of Ontario, as well as a large extension service at the Agricultural College at Guelph, including the Soil Advisory Service. If the scheme involves a forestry or wildlife problem, then the Department of Lands and Forests, which is similarly organized is asked for assistance. In the case of flood control the Authority must engage a consulting engineer to do the engineering and designing up to the point of calling for tenders and to carry the work through the construction stage. Similarly, where an Authority acquires large conservation areas which may include parks and recreation, it may be necessary to employ men specially trained in this work to design the park areas.

FINANCING

Three classes of financing are mentioned in the Conservation Authorities Act. The first is for capital expenses such as dams, reservoirs, reforestation land and conservation areas. The Authority's share of payment for these must be borne by the member municipalities which benefit from the scheme. The second is maintenance on capital costs and is paid entirely by the Authority in the same way. The third is called "Administration Costs", and includes all those activities which an Authority might be expected to engage in except capital and maintenance costs, such as salaries and travelling expenses, office rent and equipment, tree-planting machines, exhibits, visual equipment, printed matter, farm ponds, the investigation of reforestation lands and other small conservation projects.

Grants are made by the Ontario Government to all types of conservation schemes except maintenance. Grants are a matter of policy and may change from year to year. At the present time grants for flood control schemes costing less than \$5 million are 50 per cent; for large-scale reforestation 50 per cent for land purchases and 100 per cent for management. For conservation areas in which parks are situated, the acquisition of flood plain lands and all items included in "Administration Costs", the grants are also 50 per cent. In other words, for practically everything the Authorities do the Government of Ontario makes a dollar-for-dollar contribution.

For flood control schemes which cost \$5 million or more, the Government of Canada, under The Canada Water Conservation Assistance Act, may contribute on the basis of 37½ per cent Canada, 37½ per cent Ontario and 25 per cent Authority. It should be pointed out, however, that the Government of Canada is under no legal obligation to assist the province in such work because, by the terms of The British North America Act, 1867, the control of natural resources was placed under the jurisdiction of the provinces, and consequently grants for Authority work can only be obtained by, shall we say, permission of the Minister of Northern Affairs and National Resources.

ADVISORY BOARDS:

While all important decisions must be made by the full Authority and while, in the case of large Authorities, an executive carries out the routine work, in most cases the most active unit is the advisory board. Under the Act provision is made for appointing advisory boards (committees) for any subject which is considered necessary by an Authority. Such boards deal with the preliminary work, at least, in the following subjects: flood control, public relations, farm ponds and little dams, reforestation, land use, parks and recreation, and historical properties. As the membership of these boards is not limited to the Authority, it provides a splendid opportunity for assistance from groups of all kinds in the area which are interested in conservation; and while the final decisions must be made by the accredited members appointed by the municipalities, nevertheless, through the operation of advisory boards the work of conservation can become the personal concern of each individual living in the valley.

From the foregoing it will be seen that the Conservation Authorities movement in Ontario is still a comparatively recent program. Much has been done in the fifteen years since the Act was passed, but a great deal more is necessary. It may be too early to appraise the shortcomings and successes of all Authorities, but three observations may be made.

The Authorities which have become most active are those in which, prior to their establishment, there was a healthy interest in conservation among the

civic leaders, the press and the people in general. This same interest, spurred on by the fact that they now have power to plan and build in their own community, has been carried over to the Authority in action.

Rapid progress has also been made when the Government of Ontario, at the request of the Authority, has appointed a field officer to direct and co-ordinate its work. It is difficult to make progress in a large Authority if the members, who are engaged in making a living, must find time to plan and carry out even to a limited degree the broad program of conservation which the whole watershed demands. These fieldmen are employees of the Conservation Branch, whose salaries are paid by the Ontario Government and expenses paid by the Authority. Fifteen fieldmen are now employed in this work, distributed on the basis of the size of the Authorities they serve.

Finally, the Authorities which have gone farthest in this program—there are a few which have not been active—are those which have realized the true meaning of river valley development, namely, that it is a co-operative effort of all the people living in a valley. By the very nature of the problems, some areas must be dealt with first and others must wait their turn, but the valley must be considered as a unit. This is perhaps the most difficult concept to teach our people: to compel them to turn their conservation thinking not inward but outward; not to dwell on what the Conservation Authority can do for me, a private individual, but rather, what will conservation, with its multiplicity of good things, do for all the people living in the valley.

2. Surveys and Projects Completed and Underway:

Surveys made by the Conservation Branch for the 30 Conservation Authorities in Ontario cover about half of the area embraced by the 42 countries, though some surveys, particularly forest surveys, have been more extensive than others.

While the authorities are gradually spreading to Northern Ontario, the purpose of the act was for the areas of Ontario to be made up by counties. When we get into the north, we have difficulty in establishing them because there are so many unorganized townships. The overall results are summarized under the four headings of Land, Forest, Water, and Wildlife.

Land:

Reconnaissance and detailed land use surveys have been made for 23 Authorities and these have covered about 45 per cent of the total area under the jurisdiction of these Authorities.

The distribution of land capability classes in 24 detailed surveys totalling 1,050,000 acres is:—

Class I	.....	9.1 per cent
Class II	.....	43.4 " "
Class III	.....	13.3 " "
Class IV	.....	9.4 " "
Class V	.....	8.7 " "
Class VI	.....	5.5 " "
Class VII	.....	3.7 " "
Class VIII	.....	0.0 " "

Class I, I presume you all know, is the best land. Class II is good land. Class III is good land. Class IV is moderately good. Class V is non-workable, with certain limitations. Class VI is non-workable, as also is Class VII. Here we get into land which should be reforested.

In the field of land use authorities have undertaken gully control projects, sponsored land judging competitions, established demonstrations pastures, subsidized the construction of 2,350 farm ponds and conducted conservation schools for school children.

Forest:

The total area of the counties of Ontario is 7,500,000 acres. Forest surveys have covered about half of this and the results show that 1,190,070 acres, or 16 per cent, is wooded.

In the area surveyed a total of 900,000 acres has been found to be suitable only for growing trees and has been recommended for inclusion in Authority Forests. Of this land 450,000 acres are at present wooded, 360,000 are open land consisting largely of run-down pasture and 90,000 acres scrub, slash and bog land.

Authority forests, of which there are 15, now comprise 50,000 acres and the present rate of increase is about 6,000 acres per year.

Water:

Hydraulic works which have been completed for conservation purposes and their cost may be summarized as follows:

Projects to which Canada has contributed 37½ per cent of the cost	
Large dams and reservoirs	\$12,602,915
Smaller projects financed 50 per cent by Ontario and 50 per cent by the Authority	
Channel Improvements	\$ 3,671,423
River Diversions	1,145,103
Small dams and community ponds	1,205,004
Erosion control and other works	339,307

This makes the total cost of engineering projects completed to date \$18,963,752. In addition to completed projects others at present underway will cost \$11,000,000.

Besides projects completed and underway, Authorities have prepared plans for projects up to the point of construction estimated to cost \$20,200,000, carried out preliminary engineering on projects estimated at \$68,300,000, and are considering projects which may cost \$16,700,000.

In all flood control schemes at all stages of completion, construction, planning and consideration are estimated to cost \$135,394,000.

Wildlife: At the present time the Authorities have developed water for improved fish and wildlife in 16 locations. They have seven fish management projects, two fish-rearing ponds and one fish hatchery. They have two wildfowl improvement projects, two nurseries producing shrubs suitable for wildlife cover and food, and four nature trails. One Authority has successfully introduced Hungarian partridge into its area.

In the larger brief I mentioned parks and recreation, which is part of what we call conservation areas, and up to date the authorities have acquired 25,000 acres of this type of land.

The CHAIRMAN: Thank you, Mr. Richardson, for a very valuable brief. Have honourable senators any questions to ask Mr. Richardson?

Senator STAMBAUGH: I was wondering, Mr. Chairman, if any of these conservation projects were utilized for hydro or irrigation purposes or are they just designed to hold the water back?

Mr. RICHARDSON: None of it is used for hydro or electrical power development. That is all handled in Ontario by the Hydro Electric Power Commission. As a matter of fact, Mr. Chairman, there are very few rivers in southern Ontario big enough or whose flow is large enough to develop power. These projects are built mostly for flood control and the conservation of water which is held back in these reservoirs and for flushing rivers in the summertime and dry periods. When the flood period is over in some cases the lake is used as a recreation ground.

Senator STAMBAUGH: None of it is used for irrigation at all?

Mr. RICHARDSON: Not so much from the reservoirs but a lot of farmers use plenty of it for irrigation in the tobacco-growing counties, particularly Norfolk county. In fact it is becoming quite a problem when everybody puts the nozzle of his pump into the stream and pumps out water for irrigation. They can quickly pull all the water out of it. The Authorities have power to control that but they have not done too much about it. Yes, there is a lot of water used for irrigation.

The CHAIRMAN: Mr. Richardson, is there likely to be a shortage of water in southern Ontario in the foreseeable future?

Mr. RICHARDSON: Not if we practise conservation. We have a long way to go, mind you. After all, large quantities of water are wasted in the spring in these rivers and if we could just hang on to it until the summertime it would help the situation.

Senator McGRAND: Is the deep water table lowering in southern Ontario? Have any studies been made in regard to that?

Mr. RICHARDSON: The Water Resources Commission is studying that. I think it has some data on it but to determine it accurately long-time studies have to be made. Wells are being used for testing.

Senator GOLDING: In the district where I come from, Huron, it is found that farmers have to go deeper to bring water into their wells. In fact they are now talking about bringing water in from lake Huron.

Mr. RICHARDSON: They did speak of bringing it in from Lake Erie. It is a fact that farm wells have to be drilled deeper than before.

Senator McGRAND: Is this lowering a lowering of the surface water table or a lowering of the artesian basins?

Mr. RICHARDSON: This severe lowering of the water table is more noticeable near the big cities where they are drawing a lot of water from wells. After all you can only take so much water out of the ground. Many of the methods used by conservation authorities are intended to put that water back into the ground. At one of these reservoirs which I mentioned, near the city of London, on the Thames, they have been carrying out a very successful operation on what is called water spreading. There is a permanent lake at the bottom of this reservoir and the city of London pumps this water from the lake and spreads it over a gravel bearing area, and the water sinks into the ground. They have a big pump running practically all the time. That supplements the wells from which water is drawn for the city of London. But by and large I would say the records show that the water table has receded.

Senator TAYLOR (*Wesmorland*): I think that condition is true in most parts of the United States, particularly in central areas.

Mr. RICHARDSON: They do a lot of water spraying especially in and around New York.

Senator TAYLOR (*Westmorland*): Mr. Chairman, this may seem an elementary question but what is the difference between a municipality and a county in Ontario?

Mr. RICHARDSON: A county is a municipality. Starting, say, from the bottom, the township is the basic rural area.

The CHAIRMAN: How many acres comprise a township?

Mr. RICHARDSON: They vary in size. Some may contain 10,000 or 15,000 acres and some 60,000. The next unit in size is the village, then the town and finally the city. In most cases the towns and villages—there are exceptions of course—send their reeves and deputy reeves to make up the county council.

Senator GOLDING: And that is called a municipality.

Mr. RICHARDSON: They are all municipalities.

Senator TAYLOR (*Westmorland*): It is still confusing to me. In your brief you make reference to 434 municipalities and then later on you refer to 42 counties. How does that tie in, one with the other?

Senator GOLDING: Counties contain municipalities. A town or a village in a county is a municipality.

Mr. RICHARDSON: Let us take an example of the county of Carleton in which we are now. In this county you have so many townships and in the townships there are villages, towns and cities. The collection of all these townships and smaller units is called a county complete, and the smaller units send their reeves to make up the county council.

Senator TAYLOR (*Westmorland*): The township, village or city is a municipality, is it?

Mr. RICHARDSON: Yes, that is right, but the reason why we do not include counties in the authority is that you already have other municipalities in there.

Senator TAYLOR (*Westmorland*): In my province the municipality is a county, and that is it.

Senator HORNER: Part of the county.

Senator TAYLOR (*Westmorland*): No, the whole county.

Senator HORNER: No, it is not.

Senator TAYLOR (*Westmorland*): It is in our province.

Senator McGRAND: In New Brunswick the county is divided into parishes, and the council is elected from the parishes, and a parish corresponds to the township.

Senator TAYLOR (*Westmorland*): We only refer to the municipality as a total township.

Senator GOLDING: Do you not have a municipal government in the case of a town?

Senator TAYLOR (*Westmorland*): You have local government but it is not considered a municipality.

Senator STAMBAUGH: Is it not so considered in the case of a city?

Senator TAYLOR (*Westmorland*): Yes, but it is not considered a municipality; it is within the municipality.

Mr. RICHARDSON: It is in Ontario. If you look at the municipal directory you have counties, townships, villages, towns and cities.

Senator TAYLOR (*Westmorland*): How is it financed? There are various sections of municipalities, or maybe whole municipalities, or several municipalities. How do you raise money? Is it raised by the municipality on the basis of the area within the Authority?

Mr. RICHARDSON: It is very autonomous and they do things in different ways to raise money. Most raise their levy on the population basis. Some of the Authorities raise it on the total assessment in the different municipalities, the different units. In some cases they take half the assessment and half the population. Just recently I got a request from an Authority who said, "Why cannot we raise it on an area basis?" The act does not say how they have to raise it. They can do it in different ways. We have the three ways: population, total assessment, and the two combined.

The CHAIRMAN: Does that come in on your tax notice?

Mr. RICHARDSON: Yes, the Authority has the right to raise that money, and the municipalities put it on the tax bill.

Senator SMITH (*Kamloops*): I have two or three questions, inspired by the interest of many of us who are considering Indian Affairs in another committee. I am wondering if there are Indian reserves incorporated in these areas, under these Authorities. There must be some.

Mr. RICHARDSON: There are some, but they have no membership on the Authority.

The CHAIRMAN: There is no benefit from this program accruing to the reserves?

Mr. RICHARDSON: Are you familiar with the Saugeen reserve up near Southampton, in Bruce county?

Senator HORNER: Might not some benefit accrue to them?

Senator SMITH (*Kamloops*): The act says, "municipalities", and I do not know whether an India reserve is a municipality.

Senator HORNER: Supposing in your scheme to prevent flooding and land waste you plant trees. If there is an Indian reserve in the vicinity surely they will receive the taxpayer's money.

Senator SMITH (*Kamloops*): It seems to me there is room for the integration of these programs that would greatly benefit and relieve the problems which the Department of Indian Affairs is facing. So far they have not played a part, the same as the municipalities generally?

Mr. RICHARDSON: No.

Senator GLADSTONE: Mr. Chairman, we want to commend the Ontario government, because, in some cases, as far as welfare benefits are concerned, they have classified the reserve as part of the municipality. I learn from the reports and my own visit to the Ontario Deputy Minister of Welfare that there are 30 reserves now benefitting the same as does a municipality regarding welfare fund distribution; and the department is doing a good job. However, I am just wondering whether in every case where you have organizations studying land use, there could be included in their survey a study as to the best use the land on reserves could be put to?

Mr. RICHARDSON: Up to a point we do that, but as I mentioned in my summary, when it comes to active or big programs of land use the Authority has not a large staff, and they must fall back on the larger departments of government. For instance, they get the Department of Agriculture to help them.

The CHAIRMAN: Do you find the co-operation between the four departments you have mentioned is well established now?

Mr. RICHARDSON: I would say so, yes. Take the construction of highways, for instance. Incidentally, this brief was prepared a couple of months ago and I apologize for not having checked certain items in it. I wanted to omit the reference to the federal Government not contributing to any scheme costing less than \$5 million. Yesterday I was at Parkhill with the Honourable Mr. Thomas from Western Ontario, representing the Federal Government. I learned from him that the federal Government is contributing to the cost of a dam project for which the total cost is only \$1 million. In this particular case the Department of Highways of Ontario is going to re-route the provincial highway over the top of the dam, thus combining the two projects and, in lieu of constructing a bridge for the highway, it is contributing \$248,000 to the cost of construction of the dam. So that is pretty good co-operation.

Senator SMITH (*Kamloops*): In the second paragraph of your summary headed "Financing", you say: "Grants are made by the Ontario Government to all types of conservation schemes except maintenance. Grants are a matter of policy and may change from year to year." Does that refer to Ontario, or both the federal Government and the provincial Government?

Mr. RICHARDSON: I think it would apply to both. The policy on grants changes from year to year. For example, three years ago Ontario was contributing only 37½ per cent to flood control work, but around 1955 it brought the figure up to 50 per cent. The authority hopes the Government of Ontario will make some more changes, but these things are matters of policy and they do change a little each year.

Senator SMITH (*Kamloops*): What about the federal contribution, has it changed or has it been 37½ per cent through-out the program?

Mr. RICHARDSON: It is fixed by the Canada Water Conservation Assistance Act, which says the federal Government can pay up to 37½ per cent.

Senator SMITH (*Kamloops*): You say: "It should be pointed out, however, that the government of Canada is under no legal obligation to assist the province in such work." I wonder if there has been an established program by precedent or has it changed? Have there been variations from that 37½ per cent contributed by the federal Government?

Mr. RICHARDSON: No. That has been the maximum which the federal Government has been giving. That is all it was ever asked for. The first dam that was constructed under this arrangement started in 1938, the Shand Dam on the Grand, and the federal Government's grant was 37½ per cent. Each time they have made a grant it has been in that amount. However, there is another clause in the act which states that if in the opinion of the Governor in Council the project is of major importance—somewhere somebody has to make that decision for the federal Government as to whether the project is of major importance—then the grant is made by the dominion Government under the Canada Water Conservation Act.

Senator HORNER: And the grant may be above 37½ per cent?

Mr. RICHARDSON: No, according to the act it cannot be, unless for some reason the federal Government changes its policy.

The CHAIRMAN: The federal Government has before the house now a bill with respect to rehabilitation and redevelopment. How will that fit in with this Ontario program? Will that provide for more assistance than you are giving at present?

Mr. RICHARDSON: I think it will fit in very well indeed.

Senator TAYLOR (*Westmorland*): Should the word "legal" not be "constitutional"? Should it not be a constitutional obligation?

Mr. RICHARDSON: Maybe so. I am just an engineer and not a lawyer.

Senator TAYLOR (*Westmorland*): I am a little confused about this.

Senator TAYLOR (*Norfolk*): There was some controversy in Norfolk with respect to conservation areas and the municipal council's responsibility for draining an area. Under the Municipal Drainage Act if property owners petition the municipal council I believe that the council must give them drainage for that area. However, this particular area of which I am thinking was within a conservation area where there was a basin for collecting water, and there was some question raised with respect to authority. Can you tell us who has the authority in a case such as that, the conservation area or the municipality?

Mr. RICHARDSON: Did you get that information from Munro Landon? He is quite a promoter of conservation in Norfolk county.

Senator TAYLOR (*Norfolk*): No, I did not, although Landon is a very good authority there. I got my information from the newspaper which carried a report on the question between the municipality and the conservation area.

Mr. RICHARDSON: The Municipal Drainage Act of the province is pretty straightforward. It sets down what can or cannot be done. If a sufficient number of land owners want a certain area drained, and the majority who are going to have to pay for it do not object, then there is not very much they can do but go ahead and drain the area.

Senator TAYLOR (*Norfolk*): Even if it is within a conservation area where you are hoping to store water?

Mr. RICHARDSON: The only thing to do—and some of the Authorities have done this—is to go in and buy a piece of land and this nullifies the drainage work altogether.

Senator GOLDING: You mentioned the dam at Fergus.

Mr. RICHARDSON: Yes.

Senator GOLDING: Do you remember how much land was taken over for that dam?

Mr. RICHARDSON: I would think about 3,000 acres. Do you know the one at Conestogo which has just been completed?

Senator GOLDING: Yes.

Mr. RICHARDSON: They got a little more land there, about 5,000 acres. One of the best things that has been done is the building of the Luther Marsh Dam. That big marsh is now dammed up, and it is not only storing water but it is making a beautiful wild life preserve.

Senator GOLDING: How are the costs assessed there?

Mr. RICHARDSON: On the Shand?

Senator GOLDING: Yes.

Mr. RICHARDSON: The three dams have been built by the Grand River Conservation Commission which was started before the Authorities, but it is the same sort of organization. The division of costs there was 37½ per cent federal, 37½ per cent Ontario, and 25 per cent from the eight municipalities in the Commission. There are no townships or villages included. There are eight urban municipalities: Fergus, Elora, Galt, Preston, Paris, Kitchener, Waterloo and Brantford. They were charged proportionately, mostly on the basis of assessment for their 25 per cent of the cost.

Senator GOLDING: With respect to the Fanshaw dam the costs would be assessed in the same way?

Mr. RICHARDSON: In just the same way.

Senator McGRAND: This may be an unfair question, and this information may not be obtainable, but we know that when the snow disappears the grass starts to grow in the Ottawa Valley, the Montreal area and the Toronto area much faster than it does in, say, North Bay. Of course, I realize that grass starts to grow with the heat, which is essential, and moisture. What studies have there been made in the conservation of water in regard to what I am mentioning?

Mr. RICHARDSON: Do you mean the ground water?

Senator McGRAND: Yes. In certain areas vegetation starts much earlier than it does in others.

Mr. RICHARDSON: I think that is pretty generally a matter of temperature.

Senator McGRAND: Well, some of it is due to temperature.

Mr. RICHARDSON: Some of it is due to rainfall, but...

Senator McGRAND: Have any charts ever been prepared which demonstrate the relationship between the conservation of soil water and the early start of vegetation growth?

Mr. RICHARDSON: I do not know. I will not say there have not been any studies made, but I doubt it.

Senator TAYLOR (*Westmorland*): Is not that pretty well determined by the temperature in the area?

Senator McGRAND: It has something to do with it.

Senator TAYLOR (*Westmorland*): In the spring of the year in most parts of the country there is a certain amount of snow to melt, and when the grass starts to grow there is usually plenty of water in the soil. I think it is determined by the temperature.

Mr. RICHARDSON: Yes; also as to whether the spring is late or early.

Senator TAYLOR (*Norfolk*): I see from your report that you have given assistance or subsidies with respect to farm ponds. I suppose that is mostly in Norfolk county. What is the subsidy per farm?

Mr. RICHARDSON: The question of the individual Authority comes into the picture. They can make their own arrangements, but usually it is \$50 per small farm pond.

Senator TAYLOR (*Norfolk*): Is there any direction to the farmer as to where this pond should be?

Mr. RICHARDSON: Yes, they do not give the subsidy unless the farm pond has been examined as to location. In many cases they get an engineer from the Engineering Department at Guelph to investigate, because, after all, we want to make sure that when a farmer builds a pond it is going to hold water. It is pretty well supervised.

The CHAIRMAN: What size of pond would be needed for, say, ten acres?

Mr. RICHARDSON: I do not know the proportion. Do you mean ten acres of tobacco?

The CHAIRMAN: If ten acres of tobacco have to be irrigated what size of pond is needed?

Mr. RICHARDSON: I cannot give you that figure.

Senator TAYLOR (*Norfolk*): It depends on the water level. In some places the ponds have to be deeper than in other places. The engineer will determine that.

The CHAIRMAN: Have you any further questions, honourable senators?

Senator STAMBAUGH: I will move a vote of thanks to Mr. Richardson for coming here to give us this interesting presentation.

The CHAIRMAN: Yes. Thank you very much for coming, Mr. Richardson.

The committee adjourned.

APPENDIX

BRIEF

PRESENTED TO THE
LAND USE COMMITTEE
OF THE
SENATE OF CANADA

BY

DEPARTMENT OF COMMERCE AND DEVELOPMENT

HON. W. M. NICKLE, Q.C.
MINISTER

A. H. RICHARDSON
CHIEF CONSERVATION ENGINEER

TORONTO, 1961



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DEFINITION

"Conservation has many facets. It is a concept rather than a definition. As such it has accumulated to itself a breadth of meaning which has many ramifications. In its strictly etymological sense it means the protection and care of anything, but in common usage it embraces an expanding group of sciences which cover the whole gamut of our natural resources. To the man in the street conservation today means the protection and care of all the renewable natural resources of the state for all the people for all time. These resources may be considered under five headings, namely land, forest, water, wildlife and recreation, and each has many subdivisions. These subdivisions, although often treated separately, are definitely related and the study of one always leads the investigator into the territory of another, and sometimes all five, and although for the sake of clarity it is necessary to discuss each one separately, they together form an integral whole."

INTRODUCTION

Conservation has long been a subject of concern to the people of Ontario. This concern had to do originally with the protection of forests because of their importance as a source of revenue; but allied with this were the problems of wildlife management and the protection of source areas of rivers and streams. In Southern Ontario interest in conservation was indicated first by reforestation and woodlot management, but more recently this has broadened out to include flood control and water conservation, improved land use and recreation areas.

While the progress in these activities has been steady up to the present, most of the programs heretofore were initiated by government departments. Recently, however, there has been a growing conception of personal obligation, especially where land use problems, farm ponds and small reforestation projects are concerned. On the other hand, control of flooding and increased summer flow and large reforestation projects have come to be considered the responsibility of the community—the community, in this case, being the river valley.

With the advent of this new concept of personal and community responsibility in conservation, the Authorities movement was born, and the willingness of our people to undertake conservation in this way is indicated by the rapid progress made in establishing Authorities in the last fourteen years.

The Conservation Branch of the Ontario Department of Commerce and Development was established in 1944 and was charged with organizing conservation work in Southern Ontario on the basis of drainage basins, with all the municipalities continued therein as equal partners.

From the terms of the Act which established this department and the scope of work envisaged for the Conservation Branch, as embodied in The Conservation Authorities Act, it is evident that the field of conservation assigned to it is confined very definitely to working with the municipalities after they decide to carry out a conservation program within their watersheds. The Branch is therefore primarily a planning and co-ordinating arm of the Ontario Government. This must be made very clear, because there are four other departments of this government engaged in conservation activities which deal with specific phases of our natural resources.

The large forest empire in Northern Ontario, with its problems of timber management, fire protection, reforestation, forest research, fish and wildlife, recreation and allied problems, is administered by the Department of Lands and Forests. Matters dealing with soil management and drainage, farm planning, crop improvement and a multitude of other problems which are the concern of the farmers of this province are administered by the Department of Agriculture. The building of dams in the hinterland of the north to maintain lake levels and regulate summer flow is the responsibility of the Department of Public Works.

And the most recently established group, the Ontario Water Resources Commission of the Department of Municipal Affairs, has wide powers in the study and control of water problems and is concerned at the present time very actively with sewage disposal problems and municipal water supplies.

Considering the scope of conservation covered by these four departments—and some of them are quite large, Lands and Forests, for example, including permanent and seasonal help has a staff of 4,200—one may reasonably wonder why the Government of Ontario as recently as sixteen years ago in its wisdom decided to establish still another department to plan and co-ordinate conservation schemes. The answer is that this was an entirely new approach in conservation activities directed to assist the municipalities primarily in Southern Ontario.

THE CONSERVATION AUTHORITIES ACT

The Conservation Authorities Act was passed by the Legislature in the spring of 1946. It required that all municipalities in a watershed—cities, towns, villages and townships (not counties)—be included in the body corporate.

The first step in establishing a Conservation Authority is undertaken by all the municipalities wholly or partly within a watershed. Two such municipalities must first by resolution petition the Minister of Commerce and Development to call a meeting for the purpose of ascertaining whether or not it is desirable that an Authority should be established. Two-thirds of the number of representatives which the municipalities are entitled to appoint (on a population basis) must be present to make the meeting legal. If two-thirds of those present vote in favour, a resolution is forwarded to the Minister requesting that an Authority be established. The Authority is then made legal by an Order-in-Council and under the Act becomes a body corporate with representatives from all the municipalities in the watershed, including those, if any, which voted against its establishment.

Thus from the above it will be seen that the establishing of a Conservation Authority is a simple legal matter. At the preliminary meeting the presiding officer is a senior civil servant, who together with a secretary chosen at the meeting forwards a report with the resolution to the Minister of the Crown. In some cases small adjustments have been made in the area under consideration before the Order-in-Council is presented for approval, but since the inception of the work not one request for establishing an Authority has been refused.

The number of Authorities, including a Conservation Commission, which was formed before 1946, is 30. The area covered is 19,671 square miles; the number of municipalities 434, and the total membership 695.

The Authorities vary greatly in size, from the smallest with an area of 86 square miles and 8 members to the largest with 2,614 square miles and 78 members, the length of the smaller one being 20 miles and the largest one 118 miles.

THE CONSERVATION REPORT

While most of the early Authorities were brought into being because of flooding, all were aware of the necessity of carrying out such supplementary measures as improved methods of land use, reforestation, proper woodlot management, prevention of pollution, investigation of underground water supplies, fish and wildlife studies and recreation. But the Authorities were not equipped to carry out the extensive investigations that would indicate where such work should be done. Consequently the Conservation Branch of the Department of Commerce and development undertook to carry out, at no expense to the Authority, preliminary investigations as a service to the Author-

ities, to appraise, by means of surveys and reports the conservation needs of each watershed and to submit to the Authority a detailed report outlining the conservation measures that should be followed.

These reports are in the form of a working plan, and are intended primarily for the Authority members. On large watersheds they run to 600 pages, 100 maps and charts, 150 illustrations, and contain as many as 75 recommendations. In addition to the full report, a summary of this in printed form is sometimes issued for general distribution.

The survey work which is written into the report is grouped under six general headings: History, Land Use, Forestry, Water, Wildlife and Recreation. The scope of the studies made in each of these subjects varies with the condition and needs of the area under investigation, with the result that in the completed report the findings recorded are directly related to the major problems to be solved.

History:

A certain amount of historical matter is used in each report as a starting point for the study. An attempt is made to get as true and localized a picture of past conditions as possible. Experience has shown that this historical approach is of great interest to the people of regions dealt with. It often serves to promote an interest in conservation among people who would otherwise remain indifferent.

Land Use:

The approach to this subject is on a watershed basis and the relations between soil, agriculture, forestry and water are carefully considered. All existing data, of which there is a considerable amount, are heavily drawn upon in preparing the report, most important of which are the excellent soil survey carried out over the last 24 years by the Soils Department of the Ontario Agricultural College in co-operation with the Experimental Farms Service, Canada, and the basis work in physiography by Chapman and Putman of the Ontario Research Foundation.

Forestry:

The forestry report provides information regarding the condition and extent of the original forest, the sequence of wood-using industries, forest products and their yields, and conservation measures in progress on the watershed at the time of the survey, together with recommendations for future conservation measures.

Water:

Water problems begin in the office with a careful examination of all available data. Hydrometric and meteorological records kept over the years are checked and tabulated, and all available flood records are investigated and related to the gauge records of the river in question, after which the number, size and location of reservoirs required to control floods and regulate summer flow are determined. All small lakes, community ponds and old mill dams are mapped and examined.

Wildlife:

Wildlife surveys include general inventories of all species of wildlife, both game and non-game, and special emphasis is laid on vanishing or threatened species. Streams are classified as to their condition and suitability for particular species of fish.

Recreation:

Recreation surveys include estimates of the present and future population of the area served, descriptions of the present use of all recreation facilities by local and outside residents, rating of all recreation facilities—publicly or privately owned—and recommendations for new recreation areas for both the urban and rural population of the watershed.

INITIATION OF A SCHEME

When the report is presented, the Authority must assume responsibility for initiating the schemes which it considers most urgent; it must also make approaches to the government departments or other bodies from which it hopes to get assistance, either financial or otherwise.

If, for example, a scheme undertaken by an Authority has to do with land use, it must seek assistance from the Ontario Department of Agriculture, which maintains Agricultural Representatives in all the counties of Ontario, as well as a large extension service at the Agricultural College at Guelph, including the Soil Advisory Service. If the scheme involves a forestry or wildlife problem, then the department of Lands and Forests, which is similarly organized is asked for assistance. In the case of flood control the Authority must engage a consulting engineer to do the engineering and designing up to the point of calling for tenders and to carry the work through the construction stage. Similarly, where an Authority acquires large Conservation Area which may include parks and recreation, it may be necessary to employ men especially trained in this work to design the park areas.

FINANCING

Three classes of financing are mentioned in The Conservation Authorities Act. The first is for capital expenses such as dams, reservoirs, reforestation land and Conservation Areas. The Authority's share of payment for these must be borne by the member municipalities which benefit from the scheme. The second is maintenance on capital costs and is paid entirely by the Authority in the same way. The third is called "Administration Costs", and includes all those activities which an Authority might be expected to engage in except capital and maintenance costs, such as salaries and travelling expenses, office rent and equipment, tree-planting machines, exhibits, visual equipment, printed matter, farm ponds, the investigation of reforestation lands and other small conservation projects.

Grants are made by the Ontario Government to all types of conservation schemes except maintenance. Grants are a matter of policy and may change from year to year. At the present time grants for flood control schemes costing less than \$5 million are 50 per cent; for large-scale reforestation 50 per cent for land purchases and 100 per cent for management. For Conservation Areas in which parks are situated, the acquisition of flood plain lands and all items included in "Administration Costs", the grants are also 50 per cent.

For flood control schemes which cost \$5 million or more, the Government of Canada, under The Canada Water Conservation Assistance Act, may contribute on the basis of 37½ per cent Canada, 37½ per cent Ontario and 25 per cent Authority. It should be pointed out, however, that the Government of Canada is under no legal obligation to assist the province in such work because, by the terms of The British North America Act, 1867, the control of natural resources was placed under the jurisdiction of the provinces, and consequently grants for Authority work can only be obtained by altruistic persuasion and other methods.

ADVISORY BOARDS

While all important decisions must be made by the full Authority and while, in the case of large Authorities, an executive carries out the routine work, in most cases the most active unit is the advisory board. Under the Act provision is made for appointing advisory boards (committees) for any subject which is considered necessary by an Authority. Such boards deal with the preliminary work, at least, in the following subjects: flood control, public relations, farm ponds and little dams, reforestation, land use, parks and recreation, and historical properties. As the membership of these boards is not limited to the Authority, it provides a splendid opportunity for assistance from groups of all kinds in the area which are interested in conservation; and while the final decisions must be made by the accredited members appointed by the municipalities, nevertheless, through the operation of advisory boards the work of conservation can become the personal concern of each individual living in the valley.

From the foregoing it will be seen that the Conservation Authorities movement in Ontario is still a comparatively recent program. Much has been done in the fifteen years since the Act was passed, but a great deal more is necessary. It may be too early to appraise the shortcomings and successes of all Authorities, but three observations may be made.

The Authorities which have become most active are those in which, prior to their establishment, there was a healthy interest in conservation among the civic leaders, the press and the people in general. This same interest spurred on by the fact that they now have power to plan and build in their own community, has been carried over to the Authority in action.

Rapid progress has also been made when the Government of Ontario, at the request of the authority, has appointed a field officer to direct and co-ordinate its work. It is difficult to make progress in a large Authority if the members, who are engaged in making a living, must find time to plan and carry out even to a limited degree the board program of conservation which the whole watershed demands. These fieldmen are employees of the Conservation Branch, whose salaries are paid by the Ontario Government and expenses paid by the Authority. Thirteen fieldmen are now employed in this work, distributed on the basis of the size of the Authorities they serve.

Finally, the Authorities which have gone farthest in this program—there are a few which have not been active—are those which have realized the true meaning of river valley development, namely, that it is a co-operative effort of all the people living in a valley. By the very nature of the problems, some areas must be dealt with first and others must wait their turn, but the valley must be considered as a unit. This is perhaps the most difficult concept to teach our people: to compel them to turn their conservation thinking not inward but outward; not to dwell on what the Conservation Authority can do for me, a private individual, but rather, what will conservation, with its multiplicity of good things, do for all the people living in the valley.

HISTORY

Measures of conservation aim not only at saving what natural riches still exist, but also at setting right the conditions which have caused waste and destruction in the past. To find methods of correction and cure it is necessary to get at the true story of how these evils came about. This involves a careful study of developments in the past. Former conditions of climate; the records

of former floods; the spread of settlement and lumbering with the cutting of the forests which these involved; the retreat of wildlife as the clearings spread; the development of milling on the rivers; the rise and decay of village settlements; the steady growth of larger urban centres; the decline of rural population; and the phases of agricultural development, must all be studied in detail. The various general factors which influenced these developments must also be taken into account. The movement from the farms and the disappearance of small industries, for example, are not always due solely to the cutting of the forests and the exhaustion of the soil. Changed markets and methods, improvements in transportation, the opening of new areas, the concentration of industry must all be considered in their connection with their effect on conservation.

Conservation history thus furnishes the starting point for each separate division of the work and must be studied from several different points of view. It naturally deals chiefly with economic development and is concerned with local events. The general history of the country—the wars and constitutional struggles, the political, religious and educational development—affect it only indirectly and occasionally. World events are of interest only in so far as they hasten or retard the development of the countryside and the exploitation of its resources.

The first conservation reports on watershed areas contain among their introductory material sections dealing with the history of the area reported on. They were issued at a time of revived interest in local history and these history sections proved acceptable to many readers because they approached the subjects from a different angle from the majority of the local histories then available. This point of view coincided with the growing public interest in social and economic history. A wider public were becoming aware that Ontario possessed a considerable number of survivals from different periods and that these were valuable as illustrations and mementos of its history. It was obvious that these relics were inevitably threatened by modern conditions.

At that time almost no government agencies were interesting themselves in this kind of historical conservation. The efforts of private individuals or groups were achieving only a limited success. It was felt that this form of conservation might be a suitable activity for the Conservation Authorities. These sometimes obtain control of historic sites or buildings included in areas purchased for conservation purposes. It was felt that the former might be marked and the latter preserved if possible and even restored and made accessible to the public.

Early buildings worthy of preservation were often found on sites that could not be included in a conservation area. The desire to preserve these has led some Authorities to undertake or assist the setting up of outdoor museum areas of the kind initiated in the Scandinavian countries at the beginning of this century and copied on a much greater scale in the United States and elsewhere. These outdoor museums, small or larger, are included in conservation parks and at first the Authorities were permitted to include the cost of historical activities in the estimates for recreation. This meant that a share of the cost was contributed by the provincial government. Later it was pointed out that such activities were not mentioned in The Conservation Authorities Act and government contributions were discontinued. The Authorities were permitted to continue historical conservation out of the general revenue collected from the member municipalities. This has meant in many cases that Authorities have limited themselves to continuing the projects to which they were already committed, without initiating new ones. One or two, however, have shown some willingness to expand their programs. Most others would

probably be willing to co-operate with other public or private agencies in preserving sites or buildings contained in areas suitable for conservation parks or which have been condemned as liable to flooding.

The first example of historical conservation was the acquisition of the O'Hara Conservation Area, in Madoc Township, Hastings County, by the Moira Conservation Authority. This contained the sawmill built by James O'Hara about 1846-47 and operated by the family until 1908. The upright saw of the muley type and most of the machinery of the mill were intact and are believed to be the only examples of their kind in Ontario still in position. The mill and pond have been carefully restored and were officially opened to the public in 1958 with the surrounding area. The O'Hara house and farm buildings of various dates between 1840 and 1900 are also included in the area and it is proposed to extend the restoration to some of these.

Another example of an historic mill was acquired as part of an extensive conservation area by the Big Creek Region Authority. The John Backhouse grist mill, in Walsingham Township, Norfolk County, was built in 1798 and operated by the family until sold to the Authority with the surrounding estate in 1955. A plaque erected by the Ontario Archaeological and Historic Sites Board was unveiled here in 1957.

More ambitious projects are the "pioneer villages" established by the Metropolitan Toronto and Region Conservation Authority, the Upper Thames Conservation Authority, and at Doon, on the Grand River, where the Grand River Conservation Authority has furnished a site in a conservation area to a privately organized body, the Ontario Pioneer Community Foundation.

The Humber Conservation Authority acquired part of a property in Vaughan Township from the Dalziel family who had owned it since 1828. This property was situated just outside Metropolitan Toronto on Black Creek, a branch of the Humber River. It included the pond site of a sawmill built by John Smith (or Schmidt), a Pennsylvania settler, before 1817 and operated by the Dalziels until about 1870. Near the pond stands a large dressed-log barn with the Pennsylvania type of overhang, built by Smith about 1808. This was restored to house collections of pioneer objects made available to the Authority and was opened in 1954 as a summer museum. In 1957 The Metropolitan Toronto and Region Authority acquired, through Central Mortgage and Housing Corporation, another property on Black Creek at Jane Street and Steele's Avenue which contained the buildings of the Stong family homestead. These consisted of a dressed-log cabin of 1816, a larger house of about 1830, a dressed-log barn of the same type as the Dalziel barn and some other log farm buildings. The property is just within Metropolitan Toronto, across Steele's Avenue from the Dalziel farm.

It was decided to make these buildings the nucleus of an outdoor museum of the pioneer village type. The Stong buildings were restored, two frame houses, a smithy, and a village store were added before the Black Creek Conservation Area was opened and the Pioneer Village dedicated by the Honourable J. Keiller Mackay, Lieutenant-Governor of Ontario, on June 2, 1960. A frame church, a brick school house and a small cider mill have since been moved to the village. It is planned to add a number of other buildings before 1967, when it is hoped to complete the village as a fully representative picture of life in York County before 1867.

The Upper Thames Conservation Authority formally opened their pioneer village in Fanshawe Park, near London, Ontario, on June 26, 1959. It then contained a fully furnished log cabin, log barn, blacksmith shop, carriage shop and community hall. It is planned to add a church, school, general store, and other buildings. The Fanshawe Pioneer Village is intended to represent a village of the 1830's.

The Ontario Pioneer Community Foundation is financed and directed by individuals and municipalities in Waterloo County. In respect to the Doon Pioneer Village, it acts in conjunction with the Grand Conservation Authority which has provided a site of 58 acres, part of the Doon Conservation Area. A museum and administration building has been erected, as well as some barns and a store incorporating the front of an old store from the village of Delaware, near London, Ontario. Other buildings of considerable interest have been acquired for erection.

LAND

AUTHORITY PROGRAMS—SOIL CONSERVATION

Authority projects in soil conservation are an important part of their overall conservation program. By their very nature, however, these projects are often less spectacular than the building of dams for flood control, or the development of conservation lands for recreation.

In Ontario the use and management of the soil is primarily the concern of the landowner. His management program is dictated by his interests and farming experience and by economics. Most farmers realize the need for conserving their soil resources and many carry on their farming practices to this end. There are still, however, far too many who do not.

The place of Conservation Authorities in soil conservation programs is largely that of publicizing the need for and the value of proper soil management. Authorities work in close liaison with the Ontario Department of Agriculture and the Ontario Agricultural College in conservation programs. The county Agricultural Representatives are usually members of the Land Use Advisory Board of various Authorities.

In co-operation with the Department of Agriculture, and other agricultural organizations, Conservation Authorities have undertaken the following projects in the field of Land Use and Soil Conservation.

Farm Ponds:

About two-thirds of the thirty Conservation Authorities have farm pond assistance programs. Both financial and technical assistance are given. Financial assistance is in the form of a grant ranging between \$50 and \$300 per pond, depending on the size. By the end of 1960, some 2,350 ponds have been constructed under assistance programs of the various Conservation Authorities.

Farm Drainage:

One Conservation Authority, the Metropolitan Toronto and Region, gives financial assistance towards the drainage of farm land. Upon completion of the drainage work to the satisfaction of the Department of Agriculture, the Authority pays a subsidy of two cents per tile.

Demonstrations:

One of the most effective ways of arousing interest in conservation farming and improved land use practices is by demonstration. Conservation Authorities carry out land use demonstrations in several ways.

One method is to purchase land, and establish on it demonstrations of improved land management. The Grand Valley Conservation Authority has one such property of fifty acres on which they have carried out gully control, built a farm pond, and done reforestation and pasture improvement work.

Twelve Conservation Authorities have established demonstrations of such conservation measures as pasture management, reforestation, gully control, streambank erosion control and contouring and strip cropping on Authority-owned properties used mainly for recreation. These demonstrations of land

management are there for all visitors, both rural and urban to see. These demonstrations have been quite an effective means of informing the public of the value of conservation measures.

Authority assistance is extended to private landowners in carrying out specific land use improvement projects on their own land. In return for Authority financial and technical help, the landowner must agree to the use of the project as a demonstration. Often such projects have been used as a feature of a "Conservation day" in which the Department of Agriculture and local farm organizations co-operated with the Authority in publicizing the event. A dozen Authorities have held a number of such events which have been attended by a total of about ten thousand people.

The Saugeen Valley Conservation Authority has established a demonstration pasture farm on land that tends toward the marginal for most farming purposes. This demonstration shows the possibilities of various types of pasture management, and seed mixtures for this class of land. The demonstration has attracted wide interest.

Grass Waterways:

Two Conservation Authorities extend financial assistance in the form of a subsidy to landowners who build an approved grass waterway on their farms. The maximum amount payable is \$150 towards one waterway per farm.

Stream Bank Erosion Control Projects:

Five Conservation Authorities have carried out projects to control cutting and erosion of banks along stream courses. These projects have been of benefit in protecting not only farm land, but also urban land, buildings and services such as roads and sewers. In some instances they have been specific control projects; in others they have been demonstrations of what can be done to control stream-bank erosion, often with quite small expenditures and with fairly simple measures.

Land Judging Competitions:

A project becoming increasingly popular in recent years has been land-judging competitions. First sponsored in 1955 by an Authority in the Toronto region, in 1960 some 16 such competitions were held across Ontario. The majority of them were sponsored by Conservation Authorities, in co-operation with the Ontario Agricultural College and the Department of Agriculture.

Primarily designed to interest and educate rural young people in soil and its management problems, the competitions have also attracted adult interest. The usual procedure is to have instruction in the morning of the event with the actual competition in the afternoon. Soils are judged according to such factors as erosion, stoniness, drainage, slope and suitability for various crops. Contestants fill out judging cards and score points for their answers, and usually the winners are given prizes.

SURVEYS IN SOILS AND LAND USE

During the past 16 years over 40 Agricultural Land Use Surveys have been conducted in watersheds of 23 Conservation Authorities. These surveys have been concerned with the examination of the conditions of the land, and with the factors contributing to its well-being or its misuse. Such conditions as drainage, erosion, topography and stoniness are observed and mapped. The present use of the land is also recorded.

These surveys vary in detail, and to some degree in objectives, depending on such factors as the area being examined, and the availability of staff and time. Some watersheds have been surveyed on a reconnaissance scale with a very generalized survey. Others have been surveyed in detail with intensive field examination.

In all surveys extensive use is made of existing information. The chief source of data is the county soil report, produced jointly by the Soils Department, Ontario Agricultural College, and the Canada Department of Agriculture. These reports or maps have been published for 25 counties; data is available on most of the remaining counties in Southern Ontario for which reports have not yet been published.

Aerial photographs and topographic maps form the basis for recording field survey data. Such information as drainage conditions, erosion, degree of slope and the present use of the land are mapped in aerial photographs. This information forms the basis for maps of land conditions for a watershed and for compiling data on these conditions.

One end result of most of the surveys is the "Land Use Capability Classification" for the area surveyed. This system is based on the one originally developed by the United States' Soil Conservation Service, and adapted to Ontario conditions by the Ontario Agricultural College.

The system divides land into eight possible classes. These range from class 1 to class 8. All factors that contribute to the land's capability or limitations are considered in assigning land to the particular classification. Degree of slope, the presence of stones, drainage conditions, and susceptibility to erosion are factors contributing to the capability of the land. Class 1 land has few limitations and maximum capability. Class 2 land has some limitations; it may, for example, be slightly rolling or slightly stony. As the limitations on the use of land increase the class to which land may be assigned decreases. Class 8 land is the lowest class of land; in other words it has such great limitations that it is suitable only for wildlife or recreational use.

Because of differing areas and problems, agricultural land use surveys have varied both in detail and in purpose. Examination has been made of 31 per cent of the area of watersheds within Conservation Authorities for land use conditions and soil problems. Reconnaissance surveys have been done on 20 per cent of the area while detailed surveys have been carried out on 11 per cent of the area. In reconnaissance surveys as much as possible of solids and land use data is collected from aerial photographs and from soil maps. Field examination is done only in so far as necessary to adequately check the sources of information from the maps and photographs. This provides a satisfactory and usable general picture of land conditions in a watershed and is useful where the watersheds to be surveyed are quite extensive. When an extensive survey does not provide enough information a detailed survey is carried out. Detailed surveys may be done on a sample area of the whole watershed or on the watershed of a tributary of the main stream. Small watersheds selected for intensive land use study are often referred to as "little valleys". Conditions within one small valley of a watershed can often be regarded as representative of the whole watershed.

In detailed or little valley surveys the whole area selected or study is given intensive examination in the field. All information affecting the use and management of the land is recorded.

Studies have been made of several areas which have special land uses. Thedford Marsh in the Ausable River Watershed, several marshes in the South Nation Watershed in Eastern Ontario, and part of Holland Marsh have been

examined. In 1960 a detailed study of the soil and water, forest, wildlife and plant resources of a 2,600-acre bog area near the city of Peterborough was made.

Reports accompanied by maps and charts are compiled from the survey information made on land use in the valley or study area. In this report the Authority gets an assessment of the physical problems of the land in their area together with recommendations for better management of their soil and land resources. These reports are of interest not only to the Authority members but also to the staff of other government departments and organizations as well.

FOREST

Introduction

Forestry is the production of a crop of trees from which products of commercial value may be harvested. The only difference between the farm crop and the forest crop is that the farm crop is sown and harvested each year, whereas the annual forest crop must be allowed to accumulate for a number of years until the trees have sufficient volume to be worth harvesting.

Reforestation has as its starting point the gathering of tree seed of suitable species in required quantities. Most of the gathering is done in Ontario by the Department of Lands and Forests. Trees are then grown from seed in Government nurseries, three of which are in Southern Ontario. Trees are supplied to farmers throughout the Province and millions are planted on Crown land, but the greatest reforestation effort of the Government in the south has been with the counties and Conservation Authorities and a few townships. The area of reforestation planted by each of these bodies is:

Counties.....	94,101 acres (1959)
Conservation Authorities.....	50,000 acres (1960)
Townships.....	1,774 acres (1960)

While nurseries were first started in 1905, the present program of county and township forests did not get into its stride until 1922. The work was expanded with the formation of the first Conservation Authorities under The Conservation Authorities Act of 1946. Though much has been accomplished since then the amount of reforestation which has been done is only a small percentage of what is required.

The woodlots of Southern Ontario are a valuable asset both to individuals and to the economy of the whole Province. Heretofore the emphasis on farm forestry has been placed on the necessity of replanting unproductive parts of the farm. However, proper management and protection of existing farm woodlots should come first. It is just as essential to conserve what is already established as to wait for the maturing of a planted forest. Much progress has been made in assisting farmers in proper management, including thinning and improvement in their woodlots. The Trees Conservation Act has stopped clear-cutting of woodlots in counties where this Act has been applied and enforced. However, further assistance should be given to encourage farmers to appreciate adequately the value of their woodlots and to assist them in marketing their products when they are available.

Many wood-using industries operate in Southern Ontario. These include sawmills, pulpmills, veneer factories, furniture factories, as well as others requiring special products. These industries use large supplies of lumber, most of which is brought from Northern Ontario, Western Canada and the United States. Smaller quantities are purchased throughout the agricultural regions of the Province. With the exception of the Lanark County Co-Operative, which has a farm woodlot products marketing system, there are no organized methods

of marketing woodlot supplies in Ontario. Organized marketing would stabilize prices for such products and serve as a clearing house for quantities and types of certain material. Almost everything the farmer sells is aided to some extent by a scheme of marketing, and woodlot products should not be an exception.

Good forestry practice is predicated on the assumption that it will produce wood products at a profit. Regardless of this, however, forest areas in themselves have an intangible and beneficial effect on the countryside. They are the natural covering for headwater areas such as swamps and gravel moraines which give rise to many small tributary streams, and are the only crop which can be grown on the extensive rocky areas of the Province. They embrace many of the other factors included in the conservation scheme, such as surface or underground water storage, wildlife management, and recreation.

Surveys

Before a major forestry program is embarked on by a Conservation Authority, the Conservation Branch of the Ontario Department of Commerce and Development carries out a complete forestry survey of the watershed in question. This is to assess the nature and magnitude of the forest conservation problem, as it exists.

To date 12,000 square miles of watersheds organized into Conservation Authorities have been surveyed. This is approximately half the area of Southern Ontario, but includes two Authorities in the Sudbury Basin and one at the Lakehead, all three in Northern Ontario.

From observations made in these surveys, it appears that 15.8 per cent of Southern Ontario is wooded. However, the wooded area of individual watersheds varies from 43.4 per cent close to the Pre-Cambrian Shield to less than 7 per cent on the Thames River, parts of the Grand River watershed and the Metropolitan Toronto and Region area.

During the survey all of the woodlots are classified as to their species content, age, regeneration, forest condition and stocking. Scrublands or those areas producing no useful tree species, and the areas suitable for and requiring reforestation, are also mapped.

When all the survey data are summarized for each watershed, a detailed program for forest improvement is drawn up for each Authority, designed to fit the Authority's individual forestry problem. Where problem areas are too small for large-scale forestry operations, methods of small woodlot improvement or small-scale reforestation are recommended so that the Authority can promote all forms of woodlot improvement among individual property owners.

Where large-scale or block forestry operations are necessary, a Conservation Authority forest program is designed for the watershed. This is a recommendation for the acquisition of an area of existing woodlots and areas requiring reforestation, whose overall management is to be controlled by one governing body.

The Authority Forest

An Authority Forest is an area owned by an Authority consisting of woodland under management, plus areas planted to forest. Most Conservation Authorities have placed their forests under agreement with the Ontario Department of Lands and Forests for management purposes. The primary functions of an Authority Forest are:

- (1) The protection of source water areas
- (2) The control and prevention of erosion
- (3) The improvement of timber production and timber quality in natural woodlots

- (4) The return of abandoned and open lands suitable only for reforestation, to forest
- (5) The change of unproductive scrublands to productive forest lands.
- (6) The ensurance of proper care and harvesting techniques in the forest area.

To date 896,412 acres have been recommended for acquisition by Authorities for Authority Forest programs, 455,283 acres of this land are covered with natural woods, 356,922 acres are cleared, and 84,207 acres scrublands, both wet and dry.

By the end of 1960, 15 Conservation Authorities had purchased 50,000 acres which now constitute Authority Forests. In those Authorities that have established Authority Forests, 7.7 per cent of the area recommended has been acquired.

The Ganaraska River Conservation Authority, one of oldest Authorities in Ontario, has in the last 12 years purchased 39 per cent of the area recommended for Authority Forest. The Ontario Government provides a 50 per cent subsidy for land purchased.

In addition, Authorities are aided in the preparation of maps, literature, suitable conservation pictures, projector slides and lecture material for presentation to school classes, service groups and public meetings. These are all designed to increase the knowledge of all age groups about forest conservation work.

Woodland Grazing

Woodlot grazing causes a great deal of the damage to Southern Ontario woodlots. The succulent valuable species are cropped off leaving the forest floor open to erosion, water loss and a succession to weeds and low-value tree species.

Of the 1,190,070 wooded acres surveyed by the (Conservation Branch) Department of Commerce and Development, 635,519 acres or 54 per cent have been classified as grazed.

To combat this practice, the Conservation Authorities are promoting the fencing of woodlots. Demonstration woodlots are also set up to illustrate the good results of protecting woodlots from cattle.

Promotion of Proper Harvesting Techniques

Malpractices such as overcutting, waste, improper slash disposal and damage as a result of poor cutting practices in farm woodlots are fairly common in Southern Ontario.

By promoting the passing of county diameter limit by-laws and their enforcement, and by designing and recommending the use of timber sales contracts, the Conservation Authorities are working towards improvement.

Reforestation Assistance

Various types of assistance are given by the Conservation Authorities to private property owners in order to promote better land use in areas outside of the Authority Forests. Examples of these are:

- (1) Direct subsidization of private planting.
- (2) Provision of planting machinery and planting crews. A charge may be made for this service, depending on the individual Authority's policy.
- (3) Provision of delivery service of free stock being supplied to property owners.

- (4) Provision of an inspection service to ensure proper care of planted stock.
- (5) Trees for reforestation are obtained from the 11 nurseries operated by the Department of Lands and Forests which produce almost 60 million trees annually. The charge made is \$10 per thousand except Scotch Pine which is \$15 per thousand.

In addition two organizations, the Grand Valley Conservation Commission and the Metropolitan Toronto and Region Conservation Authority, have nurseries of their own, growing shrub and tree stock for erosion control and wildlife purposes.

Methods of Demonstration and Public Education

The surest way to alert the public to the value of conservation programs is to promote educational activity by public participation in conservation schemes or field observation of conservation activities. Tree-planting days for youth groups such as the Boy Scouts and 4-H Clubs and conducted tours over well-organized conservation trails are some of the methods used.

WATER

Water is of vital importance to Ontario. Geographically Ontario is said to be in a humid region, which suggests water being available in plenteous quantities. The word "humid", however, is merely an average condition between periods of drought and flood. Future growth of industrial and agricultural production and urban development may be governed in large measure by the degree of success achieved in regulation and distribution of the water provided irregularly by nature.

The super-abundance of water in times of high precipitation and low demand needs to be put in storage not only to prevent flood damages but to be distributed for beneficial uses in times of need. One of the aims of the Conservation Branch of the Department of Commerce and Development is to assist in the conservation of water resources for the use of present and future generations so that the water problems which confront the people of Ontario will be minimized. To serve this aim the Branch prepares and implements plans for flood control and water conservation on a watershed basis for the Conservation Authorities in Ontario. In the 15 years since this work started, plans have been prepared for 21 Conservation Authorities; surveys and reports for 5 more are underway. While the reduction of flood damages is a primary concern, plans for flood control must be co-ordinated with plans to solve such other water problems as domestic, industrial, and irrigation water supply, streambank erosion control, pollution abatement and water for fish, wildlife and recreation.

A. FLOOD CONTROL IN ONTARIO

There has been a great deal of flooding in Ontario, even prior to settlement. The first flood we have record of occurred in April, 1680. On an overland journey from Detroit to the Niagara River two of La Salle's companions "succumbed to the toil of walking continually in water, the constant rain and great thaw having flooded all the woods." Up to the middle of the 1800's reports of floods are few and obscure. During the period 1850 to 1960 records of floods causing property damage are available for 103 of the 110 years. The seven years for which no records have yet been found are 1855, 1876, 1877, 1879, 1915, 1924 and 1931. The cost of damages due to

floods has increased rapidly in the last half century. Losses due to flood "Hazel" in October, 1954, in the Toronto region alone ran to over \$20 million.

Floods in Ontario are caused by one or more of the following situations: rapid melting of a heavy snow pack, with or without accompanying rainfall; severe local thunderstorms; hurricane type storms; an abrupt change in the river section alignment or slope; ice jams and, man-made encroachments on the river. In May, 1960, rapid snowmelt accompanied by rains swelled most of the rivers in north-eastern Ontario to flood stage. Among the municipalities which suffered significant damage were Timmins and Mountjoy. Three notable floods caused by severe local thunderstorms are those at Barrie on June 5 1890, Dundas, August 28-30, 1956, Collingwood, July 5 and 6, 1958. The most devastating flood due to a hurricane type storm in Ontario was "Hazel" October 1954, when 86 lives were lost. In August 1883 another storm of this type caused widespread flood damage from Lake Huron eastward to beyond the Toronto area. Rain-fall amounts in excess of 6 inches in 24 hours were recorded and several lives were lost. Many municipalities situated on the Great Lakes near the mouths of the rivers suffer flooding to some degree from ice jams. Severe flooding from this cause occurs frequently at Belleville, Port Hope, Dundas, Chatham and Fort William. Backwater from bridges, culverts and mill dams which have inadequate flow openings causes flooding in many other localities.

Analyses of flood problems require careful examination of all pertinent available data and field surveys followed with detailed computations. To provide needed data on flood levels and extent of damages incurred, accounts of floods dating back over 200 years are catalogued by the History Section of the Branch. From this catalogue it may be noted that for the year 1947 alone, which is one of the worst on record for Ontario, over 80 serious floods occurred on 54 of the Province's rivers. The Photography Section photographs flood situations and obtains copies of photos of earlier floods from local residents and newspapers, all of which are useful to arrive at a logical solution to the problem.

Since the inception of the Branch, its technical personnel have been dispatched to the scene of most major floods in the Province to observe, photograph, measure and report on conditions, peak stages and flows and prepare estimates of damages. In some instances aircraft have been engaged to obtain oblique and vertical photographs of the distressed area at or near the peak flood stage. Topographic maps of the watershed are examined for possible dam and reservoir sites and tributary areas are determined. Aerial photographs are examined stereoscopically and the extent of channel improvements, dikes or diversions, needed is estimated.

Additional control data are determined by detailed field surveys. The survey parties are usually composed of university students supervised and supplemented by technical personnel from the Branch. After completion of the field surveys much detailed analysis is required for the preparation of a comprehensive control plan and report.

For the design of flood control works, the volumes and rate of run-off causing particular flood situations are essential information. All run-off and stream flow originates from precipitation and all the physical characteristics of the drainage basin influence the amount of water which reaches the river channels. Gauging of stream flow in Ontario was started systematically in 1912 by the Ontario Hydro Electric Power Commission, but was later taken over by the Federal Government. These agencies were chiefly interested in hydro electric power development and gauges were only established on those rivers which showed significant power potential. Most of the rivers with which the Conservation Authorities are now concerned were not gauged. Where flow

records do not exist preliminary design values are estimated from empirical relationships. These empirical relationships are a valuable guide but they do not replace actual gauge data.

Since the Conservation Branch was established in 1944 the number of gauges has been increased from 9 to over 120. During the past 6 years, with the co-operation of the Conservation Authorities and the Water Resources Branch, Ottawa, some 28 of the existing manually read gauges have been replaced with recording gauges which provide reliable continuous records. This program is continuing and eventually most of the gauges will be of the recording type. In addition accurate records of precipitation on the various watersheds are required. The tabulation of precipitation data is administered by the Federal Department of Transport but as in the case of the stream gauges the network of rain gauges was inadequate for accurate water control studies on the watershed with which the Conservation Branch is concerned. A program is underway in co-operation with the Federal Department to expand the precipitation gauge network.

Many advocate that flood control can be obtained through the preservation of swamps and the establishment and maintenance of forests and proper land use practices in the headwater regions. While these measures are of significant benefit to the overall water problem they are insufficient to control major floods. La Salle's difficult journey in the time when Ontario was still largely covered with forest, is evidence that floods are not due entirely to settlement activities. Land use changes, accompanying settlement and development, may create problems and increase run-off rates and cause higher flood peaks than would have otherwise occurred, but measures in addition to good forest and agricultural practices are required to give protection from floods. These include:

- (1) reduction of peak stage by channel improvements,
- (2) diversion of flood water through by-pass channels,
- (3) confinement of the flood within dikes or flood walls,
- (4) reduction of peak flow by reservoirs,
- (5) zoning or acquiring flood plains so that only low-hazard uses are permitted, and,
- (6) flood forecasting coupled with a system to warn of impending danger in sufficient time for protection or evacuation of the people and valuable property.

Channel improvements, consisting of widening, deepening, and straightening the existing channel, may be an expedient solution to the local flood situation but they tend to increase flood stages on downstream locations. Channel improvement works have been carried out by several Conservation Authorities and examples may be seen on the Humber River at Weston; the Don River at Hogg's Hollow; or the Thames River at Mitchell and Ingersoll.

Channel diversions capable of carrying the entire flood flow of a river or a flow in excess of the natural channel capacity may be constructed around a hazard area. Such a diversion has been made at Brampton where the Etobicoke Creek formerly passed under the main street in a covered channel. The original channel, with its limited capacity, was unable to handle the heavy spring flows and the business section of the town was severely flooded on many occasions. Now a diversion channel carries the flood waters safely around the low-lying centre of the town. This is a concrete-lined channel 3,100 feet in length with a 36-foot bottom width and is designed to carry 3,500 cubic feet per second, although it safely discharged as much as 5,000 c.f.s. at the time of Hurricane "Hazel" in 1954.

The Ingersoll diversion is another example of a local method. At one time the Thames River between Beachville and Ingersoll meandered back and forth across the broad flats and did considerable damage to Ingersoll and the industries located in the valley. The improved channel, designed to carry a flow of 8,000 c.f.s., now contains the flood waters; the channel is over 6 miles long and required the excavation of 1,612,000 cubic yards of earth and about 26,000 cubic yards of rock. The earth excavation was used to construct dikes along the banks of the channel and the rock for rip-rapping along the sides.

Dikes and flood walls are additional man-made encroachments on a flood plain which, while giving protection, tend to further increase peak flood stages. Their construction is only recommended when valuable property is concentrated in a hazard area.

Among the many municipalities which have parts protected by dikes are: London, Brantford, Paris, Walkerton, Bridgeport, Chatham, Ingersoll and St. Marys. A typical scheme of diking is that along the Grand River at the village of Bridgeport. Approximately 3,600 feet of like averaging 6 feet in height with a top width of 8 feet was constructed with ancillary works for a cost of about \$22,500.

Measures 1, 2 and 3 provide a degree of flood control but do not conserve water. They do not reduce the size of the flood but merely ensure that the water is safely passed through a given locality. The benefit is only local and water which will be needed later is wasted. However, such measures are needed to provide immediate relief or for reasons of economy.

Flood control plans prepared for a number of the Conservation Authorities recommend the construction of widespread systems of dams and reservoirs. The larger and more important dams and reservoirs constructed to date are described herewith:

The Fanshawe Dam and Reservoir is located on the Thames River, North Branch, 7 miles upstream of London. The reservoir, built primarily for flood control and recreation, retains flows in excess of the channel capacity through London. When the danger of flood is passed the reservoir is lowered to its "recreational pool level". The Fanshawe Reservoir has also become a valuable source of water supply for London. Fanshawe is the largest of six units required to give adequate flood protection and water conservation storage in the Upper Thames Watershed. Construction will start on two more units this year and the whole system is expected to be completed by 1970.

Construction of Fanshawe Dam was started in September 1950 and was substantially completed in time for the spring break-up of 1953. The dam, which is 77 feet high and 2,050 feet long, has rolled earth embankments with a crest-gated concrete overflow spillway. The lake at maximum level has a storage capacity of 38,880 acre feet and is over 7 miles long. At recreational pool level the lake contains 10,000 acre feet and has a surface area of 650 acres. The total cost of the project, including the reservoir, property, roads and bridges, was \$5,315,000. Of this sum the Government of Canada paid 37½ per cent, the Government of Ontario 37½ per cent and the Upper Thames River Conservation Authority 25 per cent.

Three large multi-purpose reservoirs have been established on the Grand River Watershed:

The Shand Dam—four miles upstream from Fergus established the first large conservation reservoir built in Ontario. This one unit has stopped many of the smaller floods and substantially reduced the flooding along the Grand River.

Prior to the operation of this reservoir, daily flows at Galt often fell below 50 c.f.s. during the summer and on one occasion reached a low of 26 c.f.s. Since its construction the discharge from the reservoir has maintained a minimum of 200 c.f.s. at this point. The lake also serves as a recreation centre and many summer cottages, service camps and public areas have been constructed along the shoreline.

A rolled earth embankment with concrete spillway section, the dam has a height of 75 feet and a length of 2,300 feet. The reservoir has a maximum surface area of 1,830 acres and a capacity of 49,600 acre feet. It was constructed at a cost of \$2,060,000 during the years 1939 to 1942.

The Conestogo Dam and Reservoir is located near Glen Allen and will control run-off from a drainage area of 219.5 square miles. The project cost was \$5,400,000. The dam is an earth-filled gravity type structure with a central concrete spillway section fitted with four submerged sluice gates. This dam is 80 feet high and 1,790 feet in length and creates a V-shaped lake each arm of which is six miles long. This reservoir will provide 45,060 acre feet of storage for flood control and summer flow. Like the Shand Reservoir, this lake has also brought about the development of cottage sites and recreation areas around the shoreline.

Luther Marsh Dam and Reservoir—located at the headwaters of the Grand River near Monticello, was completed in 1953 at the cost of \$233,806. This reservoir has a storage of 10,000 acre feet. Water is discharged to augment the summer flow in the Grand River. The reservoir has greatly improved the wild-fowl habitat making this Southern Ontario's best duck-hunting grounds.

These three projects on the Grand River, like the Fanshawe Dam on the Thames, were financed jointly by the Government of Canada (37½ per cent), the Government of Ontario (37½ per cent) and the participating municipalities (25 per cent).

B. IRRIGATION AND DOMESTIC WATER SUPPLY

Water requirements for irrigation and domestic uses have increased rapidly in the past two decades. The needs will be much greater in the coming decades as population pressures intensify. At the present rate of increase the population doubles in 30 to 35 years, and the rate of water use increase is greater than the rate of population increase.

The streams in some localities are pumped heavily for irrigation even in non-drought years. Farmers farther away from the streams have pumped heavily from ground water and still been frustrated for lack of sufficient water for their thirsty crops.

The advantages of reservoirs on the streams to meet needs of water supply have been indicated as a benefit associated with flood control. In addition to large reservoirs on main streams, irrigation requirements can often be met economically from small reservoirs in upstream areas supplying a few farms directly. Where the geology does not suit the establishment of surface reservoirs, ground water reservoirs may be used if the recharge can be kept equal to the demand.

The Conservation Branch has made irrigation water supply studies for the Ganaraska and Big Creek Conservation Authorities in which a combination of surface and ground water supply areas has been suggested to meet the needs. In regions where there will be intensive pumpage from ground water it is important that the aquifer be adequately recharged. In some cases special work must be undertaken to recharge ground water reservoirs. This process

is called "water spreading". Water available in times of excess run-off is spread over an area which will allow rapid infiltration to the aquifer being used. A water-spreading project has been undertaken by the Catfish Creek Conservation Authority near Aylmer.

In addition to the multi-purpose projects described earlier, some Conservation Authorities have undertaken specific projects to boost municipal water supplies. The Ausable River Conservation Authority has constructed the Morrison Dam and Reservoir near Exeter to provide water to that town and adjacent municipalities, while the Napanee Valley Conservation Authority constructed a dam to enlarge the usable storage of Second Depot Lake to 7,000 acre feet. Water is discharged during low flow periods to augment the flow in the Napanee River on which the Town of Napanee relies for domestic and industrial water. On the way to Napanee the regulated flow helps mill operators and improves wildlife habitat. Though Second Depot Lake is not large enough to contain all the flood waters from its watershed, the dam is operated to reduce the flood peaks as much as possible.

Similarly the Morrison Dam near the headwaters of the Ausable River conserves water which would otherwise be wasted. This dam was built in conjunction with a township road bridge and illustrates how the various public bodies can co-operate to develop natural resources for public benefit.

The dam has a free overflow concrete spillway section located under the bridge span with earth embankments on either side. It is 20 feet high and stores approximately 50 million gallons of water.

In addition to these larger reservoirs more than 2,500 farm ponds have been constructed for irrigation farm water supply and recreation.

C. LAKE LEVEL REGULATION

Some of the watersheds in Southern Ontario contain many fine natural lakes whose shorelines have been extensively developed for recreation uses. Regulation of levels of these lakes to provide a stable lake surface at certain times of the year is another job undertaken by Conservation Authorities. While it is important that the lakes have a stable level during fish spawning periods, it is difficult to prevent large variations in lake level during periods of high run-off. Indeed, it is desirable from the standpoint of downstream flood control to regulate the outflow from these natural lakes in such a way as to store some of the flood peak for later discharge.

D. COMMUNITY PONDS

In addition to the types of water control projects already described, many Conservation Authorities have established community ponds. Besides providing recreation facilities, the community pond has a number of other advantages. Since these ponds are generally created close to a community they provide a certain degree of fire protection. Many small hamlets do not have adequate water systems to cope with a major fire, and water from community ponds has been used for this purpose on many occasions. This protection applies not only to buildings but also to valuable woodlots and farm crops located nearby. A further asset of the community pond is its ability to provide habitat for various forms of wildlife. Ponds can be stocked with fish and, provided conditions are favourable, wildfowl, muskrats and other desirable animals may be encouraged to inhabit its waters. Besides these material benefits, community ponds have an aesthetic value which cannot easily be measured in dollars and cents.

Suitable locations for community ponds are often within a flood plain. Community pond development without damageable property build-up is one of the desirable uses for flood plain lands. Flooded gravel pits, quarries and old mill ponds have been converted for extensive community uses.

The largest unit of this type is the Guelph Dam and pond on the Speed River at Guelph. The dam raises the water 11 feet creating a large pond which forms the nucleus of a riverside park. In order to allow the unrestricted discharge of the high spring discharges the dam is fitted with three electrically operated large steel gates, each gate being 32 feet wide by 11 feet high.

E. FINANCING

In all, the water control works completed or underway at January 30, 1961, amounted to \$30,082,377. The majority of these projects were financed by the local Authorities with a 50 per cent grant from the Province. The more costly dam and reservoirs were financed, 25 per cent by the Authorities and 37½ per cent by each of the two senior governments. The status and value of water control projects of the Conservation Authorities, as of January 30, 1961, are summarized in the following table and a detailed list of these is given in the attached Appendix I:—

(a) Projects completed or underway	\$30,082,377
(b) Projects completed to point of construction ..	\$20,228,405
(c) Projects—Preliminary Engineering only	\$68,357,000
(d) Projects for future investigation	\$16,726,500
	<hr/>
	\$135,394,282

HYDROMETEOROLOGY

I. Hydrometeorological Analyses and Research

Variations in meteorological conditions have a pronounced effect on the flow pattern of the streams and rivers of Southern Ontario. Local intense rain can increase the flow from a trickle to a flood in a few hours. A warm spring day can produce sufficient snowmelt to develop floods overnight. On the other hand periods of drought will reduce river flow to negligible amounts.

Problems such as these which concern the relationship between meteorology and hydrology must be considered in detail before controls can be established on a river. Hydrometeorological analyses are therefore an important part of the water studies of the Conservation Branch.

These analyses which require data from an extensive network of precipitation and stream gauge stations relate rainfall, snowmelt and soil moisture conditions to runoff in the streams. Such studies establish the characteristics of the stream under a variety of meteorological conditions. The results are used to establish the capacity of reservoirs, the size and type of dam structures or channel improvements and the availability of water for urban use, irrigation, pollution control, recreation and power supply.

As the demands for water and the need to control it for protection and use increase the value of accurate and detailed hydrometeorological analyses will become more and more apparent.

Besides giving attention to hydrometeorological analyses the Conservation Branch is also concerned with research in the water balance of different regions of the province. Two projects are underway at the present time. One,

on the Thames River watershed, at the Fullarton Hydrologic Research Station is examining the rainfall-runoff relationship on a small agricultural watershed. The other is studying the water-level variations in Cavan Swamp on the Otonabee River watershed.

Research in all aspects of the water cycle is of utmost importance to the solution of the problems of water control and management. The Conservation Branch through its research projects is endeavouring to assist in the exploration of this field.

II Flood Warning

The responsibility for flood warning in Ontario rests with the hydro-meteorological section of the Conservation Branch. As these activities are unique in Canada a detailed account of the program is given here.

Ontario's Flood Warning System

Introduction

The Flood Warning System in Ontario is designed to:

1. Alert the general public to the danger of floods by indicating where and when they will occur,
2. Alert flood assistance agencies such as Civil Defence, Red Cross, etc., to the regions in which they may be required, and
3. Advise in the operation of flood control dams and reservoirs in order to obtain the most advantageous use of these works and structures.

A basic feature of this system is close cooperation between the federal government department responsible for weather forecasts and the provincial government department responsible for river control. The Meteorological Branch, Canada Department of Transport is responsible for all weather forecasting in Canada. This Branch therefore, issues the necessary weather data, weather forecasts and warnings of severe weather conditions, while the Conservation Branch of the Ontario Department of Commerce and Development applies this weather information to conditions existing on the watersheds and issues flood forecasts on the results of the correlation of these two types of information.

The close co-operation of these two government departments and their appreciation of the effects of weather on streamflow in producing floods is further indicated by the fact that the Meteorological Branch has seconded a Meteorologist to the Conservation Branch to head the Flood Warning System. In this position which is designated as hydrometeorologist, he is responsible for maintaining a watch on river conditions, issuing flood forecasts, supervising the operation of flood control reservoirs, and establishing hydro-meteorological design criteria for river control structures.

The details of the flood forecasting procedures are discussed in this paper. A brief summary of the physiography and climate of the region is also included in order to indicate some of the problems involved.

Physiography

The attention of the Flood Warning System is directed primarily to the more heavily populated section of the Province, which is enclosed in the triangle made by Latitude 45° north on the north, Lake Huron on the west and Lakes Erie and Ontario on the south. This is an area of approximately 30,000 square miles.

The northeastern portion of this region is Precambrian Rock, dotted by innumerable small lakes. The remainder is clay soil of comparatively low relief and gently rolling. The elevations range from 245 feet above mean sea level, which is the level of Lake Ontario, to a maximum of 1,700 feet.

Many streams and small rivers cross this region, draining into the Great Lakes. The largest river, the Grand, has a drainage basin of 2,600 square miles. The stream gradients vary from steep to flat.

The flood plain along many of the rivers has been encroached upon for housing, industry, transportation and other uses.

Climate

The annual precipitation averages between 30 and 35 inches and is fairly evenly distributed throughout the year. From November to March, however, this is mainly in the form of snow so that when spring breakup comes a very heavy runoff occurs. This frequently produces floods.

High intensity rainfall occurs during the summer as a result of thunderstorm activity. The highest recorded one-hour rainfall amount being 4.5 inches.

Remnants of tropical hurricanes may cross this region during the summer and fall giving abnormally heavy rain. Their frequency, however, is limited to about once in two or three years.

Weather Forecasts

A variety of weather forecasts are issued by the Meteorological Branch and are available to the Flood Warning System. A general forecast, covering a two-day period is issued at six-hourly intervals and is generally adequate for maintaining a normal river watch.

Special warnings are issued whenever heavy rains of 1" or more are expected. These warnings indicate the amount, location and time of the rain, along with the speed and direction of motion of the storm. These warnings are issued up to 24 hours before the occurrence of the rain.

Weather advisories covering a three-to-five-day period are also issued whenever a change in the atmospheric circulation pattern is expected to produce a marked change in the weather conditions which will adversely affect river flow. This information is particularly important during the late winter when marked warming or heavy rain can result in rapid snowmelt, high runoff and consequent flooding.

Weather discussions between the two offices are also a regular procedure whenever forecasts indicate severe weather conditions.

River Forecasts

The forecast methods and procedures are discussed here under three general headings, analyses of streamflow characteristics, current data on soil moisture and riverflow conditions, and river forecasts and flood watch.

1. Analyses of Streamflow Characteristics and Infiltration Rates

During the past several years the Conservation Branch has had an extensive program for the installation of recording stream gauges on the rivers of this region. This is now being expanded to include many of the tributary streams. Assistance is also being given to the Meteorological Branch in establishing recording rain gauges on the watersheds. As the information from these instruments becomes available it is used to prepare hydrographs, isohyetal maps and associated graphs. Computations are then made of lag times, infiltration rates along with depth-area-duration curves and unit hydrographs as a means of establishing the streamflow characteristics in relation to rainfall patterns.

All major storms and many minor ones are analyzed in order to obtain as much detailed information as possible on streamflow conditions.

2. *River Stage, Soil Conditions, Snow Depth and Water Content of Snow on Watersheds*

Detailed and up-to-date information on the prevailing river stage, flood storage available in reservoirs and soil conditions, is on hand at all times for the river forecaster.

For forecasting purposes soil conditions are translated into runoff rates through calculation of the antecedent precipitation index. The method used is similar to that developed by the U.S. Weather Bureau.

Measurements of the depth of snow and its water content are taken over the region at regular intervals throughout the winter. These data are particularly important in assessing the flood potential of the spring runoff or the development of floods as a result of winter rains.

From the data and calculations listed under sections 1 and 2 the river forecaster issues weekly advisories to the Field Officers of the Conservation Branch who are responsible for watershed management in their particular region. These advisories indicate the amount of runoff to be expected with varying amounts of rain under the prevailing soil moisture conditions. Extended period weather forecasts are also issued along with these advisories. By this means the men in the field are kept advised of the prevailing conditions as they affect their particular river and are alerted to the possibility of adverse weather conditions. They are expected to keep a watch on short period weather forecasts as a supplement to the weekly advisories.

3. *Flood Forecasts and Activities During Flood Conditions*

Flood forecasts are issued at the discretion of the hydrometeorologist whenever he feels that they are warranted. Once a river forecast has been issued regular advisories are given on the development of flood conditions until such time as a final message is issued indicating the end of the flood alert.

Special Observations

In order to obtain direct information on rainfall amounts and intensity which may result in flooding, a network of special rainfall observers has been established to assist the Flood Forecast System. These observers initiate a telephone call to the river forecaster whenever they receive an inch or more of rain within 24 hours. They also take extra readings on request. These observers are all on a voluntary basis.

Weather radar is also used to assist the flood forecaster in locating the rainfall centres and the extent and movement of the storm. This has proven to be a very valuable tool. At present there is only one installation, at Toronto, about the centre of the forecast area. Further installations however, will be made in the near future, enlarging greatly the area of coverage by radar.

Information on river stage is obtained from the gauge readers at the observation stations. However, in those regions where flooding is a recurrent problem, particularly during spring runoff, a corps of river observers is organized. These persons are located at strategic points along the river and supply regular readings of the river stage during the floods.

Delivery of Flood Forecasts

Flood forecasts are issued to commercial radio and television stations for broadcast or receipt. The forecasts are also telephoned direct to the Field Officers in the region affected and to the local police and other organizations directly associated with flood protection. In several towns and cities, flood

organizations have been established which include the police departments, fire departments, Red Cross, Civil Defence, Welfare Agencies and private citizens. These organizations have the responsibility for protecting life and property in the event of flood.

During severe flood conditions units of the Canadian Army are placed on standby on receipt of the flood forecast in order to be of assistance should the local agencies be unable to handle the emergency.

Operation of Flood Control Reservoirs

Many of the flood control reservoirs in this region are operated on a multi-purpose basis which includes water supply, recreation, power and pollution control. For this reason the reservoir must be filled from the spring freshet but, as a flood protection measure, the filling must be done in such a way as to reduce the flood peak. It is therefore necessary in years of heavy snow accumulation for the hydrometeorologist to forecast the runoff hydrograph so that the dam and reservoir can be operated as an efficient flood control system.

In summer and fall months the full flood control capacity of most reservoirs can only be obtained by dumping water. This procedure requires detailed forecasts of rainfall amounts, infiltration rates and runoff which are obtained through direct consultation between the weather office and the river forecast office. To be of any appreciable value dumping of water from the reservoir must begin about 12 hours ahead of the storm.

Conclusion

The effectiveness of the Ontario Flood Warning System is maintained primarily through co-operation between the Meteorological Branch, the agency responsible for issuing weather forecasts and the Conservation Branch, the agency responsible for watershed management in the Province of Ontario.

WILDLIFE

1. Objectives

There are two quite separate objectives concerning wildlife. The first is to retain for the citizen the opportunity to fish and hunt, within the law, in an attractive environment, and where possible, to trap fur for profit. The second is to retain for every citizen the opportunity to see and enjoy the varied forms of birds, mammals and other wildlife of any region in the greatest possible variety.

Land well adapted for wildlife should produce or harbour a permanent population of interesting species and an annual crop of game and fur, with no adverse effect on farming or forestry practices. The control of harmful species and the maintenance of all other animal populations at a desirable level is a natural branch of good land use. The traditional methods of wildlife management have included restrictions of the daily and seasonal kill, predator control, reservations of gamelands and artificial re-stocking. The provision of a proper habitat, or living quarters, is often more important than all of these.

Because there is now a high percentage of young woodlands, following cutting or fire, most of the non-agricultural land of Ontario now provides better cover and food for wildlife than it did in pioneer days. Following the greatly improved administration of game and fur management in Ontario in recent years, most species in the forests have risen rapidly from their former declining numbers and many species, such as deer and beaver, present a problem of over-population in some parts of Ontario.

Little wildlife remains to be conserved in agricultural Southern Ontario, apart from the introduced European hare, the cottontail, the fox and, in a few areas, muskrats. The chief causes of this situation are poor food and cover conditions, resulting from existing agricultural practices, destruction of roadside vegetation, the grazing of woodlots, and extensive drainage. The situation is aggravated by heavy hunting pressure. Sportsman-farmer relations are at present so poor that farmers have no incentive to improve game conditions.

Three important problems remain to be overcome. The first is the need for increased research leading to a knowledge of the critical factors controlling wildlife populations; the second is the enormous areas which have to be patrolled by individual game overseers; and the third is the fact that there are more hunters, at least around the larger cities, than are consistent with the present supply of game.

The situation of game fish in the waters of Southern Ontario is similar to that described above for game, fur and spectacular species. Lakes and streams in non-agricultural areas have been little affected as suitable habitats for fish, but the fish populations in many of the accessible waters have been decimated by over-fishing, or by the upsetting of the natural balance between game fish and other species. In Southern Ontario speckled trout waters are now scarce, and many of the remaining streams are closed to the public. Even good bass streams are no longer common.

The chief requirements for stream improvement are exactly those which are needed for other conservation ends. Permanent flow and the control of silting from erosion debris are the most important needs. Other major factors affecting the distribution of the better game species are pollution, (chiefly from sewage treatment plants, industrial wastes, cheese factories, and from cattle), the high summer maximum water temperatures, and the lack of shade to keep the waters cool. Well-planned small dams in the cooler sections of streams would greatly increase the available trout water. Better control of the levels in lakes having muskellunge for a short period after spawning would greatly increase the numbers of this species.

In the last hundred years there has been an alarming decrease in the total numbers of wildfowl which breed in or migrate through Ontario, and also a great decrease in the amount of available wetlands in Southern Ontario.

2. Conservation Authorities

Fish and Wildlife programs in which Conservation Authorities are interested involve, firstly, surveys carried out by the Provincial Department of Commerce and Development at no cost to the Authority; and, secondly, action programs carried out by the Conservation Authority.

(a) Surveys

The chief survey work has been concentrated on the environment for fish, particularly in rivers and streams. Stream temperature, frequently the critical factor, permanence of flow, fish cover and pollution of streams are given special emphasis, and to this end, surveys have been made of every stream in the Conservation Authority areas since 1946 for the purpose of classifying the environment as suitable for one species or another. The chief method is the collection of the bottom fauna of streams, since research has shown that certain insects are extremely sound indicators of the permanence of flow and maximum temperatures which will be encountered in an average summer. The maximum temperature in summer is frequently the control which decides what species of fish will be found in a stream. This can be deduced at any time of the year, since the insect larvae are always present. With this basic information mistakes in stocking streams can be avoided.

Collections of fish by gill nets, minnow seines and electric fish shockers, along with records of continuous recording thermometers have supplemented and supported the above data. Recommendation of sections which appear to be suitable to game species but which are not now accessible to them, have been made. Maps showing the biological conditions of more than 5,000 miles of stream courses have been made from these surveys.

Since serious pollution also affects streamlife, pollution is also mapped. For some rivers the oxygen content, the biochemical oxygen demand and the oxygen sag curves have been measured.

Where the control of lake levels has the double function of easing conditions for cottage owners and maintaining good spawning conditions for such species as muskellunge, the surveys include the basic data on water quality, depths, vegetation and bottom conditions.

The value of wetlands is assessed, based on the amount of water and the quality of the vegetation. In some watersheds, detailed surveys of the small mammal populations have been made, and the habitats where they may be expected, because a few species can radically affect young forest plantations.

Areas containing rare or spectacular species are recommended for acquisition. Areas of possible interest for nature trails are also recommended.

(b) Action Programs

Fish and Wildlife Advisory Boards have been established in many of the Conservation Authorities. These are composed of members of an Authority, the local District Biologist and invited competent members of the general public. The wide scope in the Conservation Authorities' programs provides many opportunities for fish and wildlife management projects.

Some examples may be given of such projects. One of the main categories of land purchased by Conservation Authorities is flood plain land, and thereby many stretches of stream are made available to fishermen. These purchases have contained both warm water fish and trout habitat, and where heavy fishing pressure occurs an arrangement is made whereby the Department of Lands and Forests stocks yearling trout annually. Severe flooding, characteristic of this particular type of purchase, prohibits conventional stream improvement measures, but in some cases, removable dams have been constructed.

Properties with lakes or ponds may be purchased, providing the surrounding lands are conservation lands under the terms of the Act; for example, an area of rugged topography ill-suited for agricultural pursuits. Many Authorities have developed such properties for fishing as well as for swimming and picnicking. In many such lakes or ponds, coarse fish populations have been eradicated and game fish restocked. For example, Heart Lake, north-west of Toronto, was reclaimed and a combination of largemouth bass, Kamloops trout and bullhead is now under study. Many of the 2,500 farm ponds which the Authorities have helped to build, are now used for fishing or for wildlife production. Ponds which become too warm for trout during the summer months, can provide a short, seasonal trout fishery in the early cooler months. Very high returns of stocked fish can be obtained in the first few weeks of the season, and the fishing season is thus extended by two full months.

"Put-and-take" management may accommodate large numbers of anglers. For example, at the Glen Haffy Conservation Area near Toronto, two public fishing ponds are stocked at frequent intervals throughout the fishing season. About 7,000 anglers visit the ponds each year and harvest close to 3,000 speckled trout.

Authorities are now being encouraged to obtain plans for a fish and wildlife program along with the preliminary engineering.

Authorities are beginning to appreciate the value of tailwater fishing, (particularly where a bottom discharge can provide trout habitat), and therefore to plan below a reservoir as well as in one. An example is the rainbow trout fishing now available below Bellwood Lake. The excellent waterfowl hunting at the Luther Reservoir is a by-product of the flood control program of the Grand River Conservation Commission, an agency affiliated with the Conservation Authorities.

The Authorities are also being encouraged to introduce some variety, or "edge", into the forest plantations, which are now common to our landscape. With few changes in reforestation procedure and with an added investment in stream improvement, ponds and shrub plantings, these tracts can now lend themselves to low intensity public use. In fact, two Conservation Authorities produce shrubs for wildlife habitat improvement, and most of these shrubs find their way to reforestation tracts in Conservation Areas. Many are used in streambank and gully plantings.

Several lakes formerly ditched and drained, now have controlled levels through the building of small dams. The only publicly-owned fish ladder in Ontario was constructed by the North Grey Region Conservation Authority on the Sydenham River and now receives an excellent run of rainbow trout from Georgian Bay. It is doubtful if anyone would have assumed this responsibility if the Authority had not.

Nature trails are now constructed in several of the Conservation Areas owned by Conservation Authorities. More than 50,000 persons used the Nature Trail at a single Conservation Area in 1960.

(c) *Research*

Since the rapid growth of aquatic plants and algae has become a problem in many of the ponds owned by Conservation Authorities, extensive research has been carried out on methods of control of this problem.

RECREATION

1. *Objectives*

Recreation, the enjoyment of leisure time, is now recognized as an essential physical and mental need. Good recreation facilities are known to be as significant in modern life as are good working conditions. Since many types of recreation facilities involve use of the land, recommendations for the proper use and development of recreation resources are a normal part of any land use plan.

The type of facility which, from the conservation point of view, has been largely ignored, and is greatly needed, is the public area within a drive of one or two hours at most from the agricultural or urban worker's home. In the past the planning of recreation facilities in Ontario has been chiefly directed towards two ends; facilities such as parks and playgrounds, within the boundaries of cities and towns, and facilities for long and comparatively expensive vacations in wilderness regions far from the agricultural and industrial areas of the province. The time and cost involved in reaching wilderness areas have prevented the average family or group from visiting such areas more than once or twice a year. More accessible facilities such as parks and beaches are therefore greatly needed. The areas which are of greatest interest to Conservation Authorities are usually those which lie in a zone from twenty to fifty miles from the centre of large urban areas. These areas are beyond the interest of municipal park authorities and yet are, in most cases, too close to urban areas for development by the Parks Branch of the Provincial Department of Lands and Forests.

In order to fully appreciate the Authorities' achievements in the field of recreation, the intent of the Conservation Authorities Act, (R.S.O. 1960, Chapter 62) must be understood. Lands acquired by Conservation Authorities must, in the first instance, be capable of performing a use relative to Conservation. For example, flood plain lands, valley slopes, source areas, reforestation land, woodland and wetland are suitable. If these lands can, in the second instance, be used for recreation without seriously interfering with their primary function, then they should be so used.

This is not a small or insignificant problem. More than \$250 million are spent annually on recreation in Ontario. The capital invested is very great, and every sign indicates a rapid future growth. It is therefore important that the remaining natural facilities should be wisely developed and at least a part of them preserved for public use.

Modern conservation measures inevitably involve important changes in the landscape, affecting the rivers, lakes and woods as well as farming land. Clearly any changes should be adjusted so that the recreation needs of the public are not overlooked.

Lands acquired for conservation purposes and used for recreation are known as Conservation Areas. Of the many possible facilities, beaches, picnic sites and roadside parks are normally the most used in Southern Ontario. Facilities for camping and boating, fishing and hunting, skating, skiing and nature-study are also important. Even such simple facilities as small swimming holes are fast disappearing in Ontario.

There is no reason why recreation areas should not also be of educational value. For instance, erosion control demonstrations and other examples of good land practices and good forestry excite general public interest as do also historic sites. Moreover, in planning for such recreation centres, the emphasis should not be placed too much on the value of these for city people only. They should be planned for and made easily accessible to the farming population as well.

2. Surveys

The first requirement for a recreation program by a Conservation Authority is an extensive survey in which the needs (examined with an eye to the present and future population) are balanced against the available recreation lands where various conservation practices can be carried out. Spectacular land forms and the locations of rare geological formations or of unusual flora or fauna are noted. Good access from first-class highways is essential.

The surveys are carried out by the Provincial Department of Commerce and Development, at no cost to the Authority. The value of the lands is taken from the assessment rolls in municipal offices, and after careful comparisons the cheapest of the various areas chosen are recommended for acquisition.

3. Authority Programs

The creation of Conservation Areas with recreation facilities included has been one of the most spectacular developments in Ontario in the 14 years since the first Conservation Authority was established. Parts of many Conservation Areas have been already developed for intensive use, but many Conservation Areas have been acquired and are being held until either the need for use increases or the funds become available for more intensive developments. Some lands are attractive for recreation without any development at all.

The Metropolitan Toronto and Region Conservation Authority has prepared extensive plans for flood control which include the building of many dams and

the acquisition of 7,450 acres of flood plain, and less pretentious plans have been prepared by the Upper Thames and Ausable. These lands would be acquired in order to:

- (a) transfer the risks of flood damage from private owners to the Authority and prevent their use for residential or commercial uses;
- (b) develop the flood plain lands as parks and Conservation Areas, preserving and enhancing the aesthetic value of the lands.

The cost of the Metropolitan Toronto and Region Conservation Authority flood control scheme, already approved by the Authority and the Provincial Government, and awaiting approval of the Dominion Government, is approximately \$38 million, that of the Thames (already approved by Canada) is \$10 million and the Ausable is \$1 million.

The following list shows the chief Conservation Areas already acquired:

CONSERVATION AREAS ESTABLISHED AND PARK AREAS DEVELOPED

Conservation Authority	Conservation Areas		Park acreage
	No.	Acres	
Ausable.....	4	411	32
Big Creek.....	10	467	156
Credit.....	6	919	135
Ganaraska.....	2	35	10
Grand Authority.....	5	806	390
Grand Commission.....	3	13,392	1,100
Holland.....	1	20	10
Junction Creek.....	1	3	—
Metropolitan Toronto and Region.....	17	3,999	503
Moir.....	5	588	171
Napanee.....	1	800	—
Niagara.....	2	242	42
North Grey.....	3	130	—
Otter.....	4	60	10
Sauble.....	2	182	4
Saugeen.....	7	177	27
Sixteen Mile.....	3	451	—
Spencer Creek.....	1	50	50
Upper Thames.....	13	2,818	528
TOTAL.....	90	25,550	3,168

4. The Parks Assistance Act

The Parks Assistance Act, enacted in 1960, is administered by the Department of Commerce and Development. Under this Act, the Province of Ontario is prepared to assist with grants for the acquisition of land and the development of Approved Parks. This assistance covers acquisition of land, development of it, or the conversion of a provincial or public park into an Approved Park. The provincial grant does not exceed \$50,000 or 50 per cent of the cost of acquisition and development. The chief facilities that are required to be provided are camping, trailer parking, water and sanitary facilities as well as sites for picnicking.

Many applications have been received for assistance under this Act, and already seven have been approved. Several of these will be in operation in the summer of 1961.

PUBLIC RELATIONS

Conservation is not actually a very new idea. It has been preached for a generation or more and has been practised in some places for many years, but the public of Ontario has not yet entirely grasped the meaning or accepted the urgent need of conservation.

Public relations are then an important and delicate problem of conservation work. Much good work has been done in the past by certain agencies to put before the public the case for conservation each in its own separate field. For example the Department of Lands and Forests has been energetically and on the whole very successfully preaching the need for preserving and replacing the woodlands. It has been able to secure the active co-operation of a large part of the public, and private societies are now playing a large part in this work. The fact, however, that each group was working separately has resulted in some confusion and over-emphasis on particular aspects of the problem. The section of the public that had become aware of a need for action was often inclined to regard conservation as involved only with one or two fields of activity and so affecting only those directly concerned with these fields.

There was a need for a co-ordinated program of information and explanation of the whole problem. There was also the necessity of overcoming the natural repugnance of many people to a course of action which involved public spending and the enforcement of restrictions on the use of property. The caution and inertia which make people unwilling to abandon old customs for new methods had to be overcome, and the "geographical" nature of conservation problems and the need for co-operation among a number of different governing bodies had also to be explained and accepted by the people concerned. To do this it is necessary to take advantage of every means that may become available. Lectures, articles, films, displays and field demonstrations can all be used to keep the idea of conservation before people of the country and explain its meaning to them. A few years ago it was difficult to procure material in the form either of films or photographs which dealt with the need of conservation in Canada. Almost all films and most photographs of this kind had to be obtained from the United States, but this situation has changed. Much material showing the results of conservation practices in Ontario is now available. To obtain informed and sympathetic coverage of these activities in the press naturally forms a major aspect of public relations work.

A great deal has been accomplished in this field during the past sixteen years, but a great deal remains to be done. Each new Authority constitutes a fresh problem in public relations and the demand and need for public information still go on.

With the actual beginning of conservation work in any area, the importance of public relations increases and the character of the work changes. It is of vital importance to secure the willing support and co-operation of those individually and directly affected by the schemes proposed. Without this not only may the local proposals be delayed, but the future growth of the whole movement may be endangered. Although arbitrary powers to enforce co-operation are a necessary part of the equipment of any Conservation Authority, it is the ideal of the conservationist that these powers should remain in abeyance and that the work should be carried out as far as possible with the willing consent of all concerned. The delicate negotiations and personal diplomacy needed to bring this about are an important part of public relations in conservation.

To achieve these ends the Authorities do not limit themselves to the standard public relations channels of the press, television, and radio. Their representatives are constantly lecturing to service clubs and other public spirited

bodies. They set up exhibits at the Canadian National, Central Canada and Western Ontario Exhibitions as well as at ploughing matches and numerous fall fairs. They inaugurate and carry out soil-judging competitions. In the spring they hold tree-planting days, and fishing competitions for school children and Boy Scouts. During the school year they organize conservation scrapbook competitions, bird-house building competitions and leaf collections. Publications have included "Our Valley" a semi-annual report written in layman's language, but now discontinued; bulletins on farm pond construction and summaries of conservation reports. The Conservation Branch of the Department of Commerce and Development has recently issued a well illustrated brochure entitled "Conservation Authorities, Progress and Achievements" which outlines the conservation story to date.

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APPENDICES

LAND

Summary of Agricultural Land use Surveys—1946-1960

Total number of Authorities.....	30
No. of Authorities given land use surveys.....	23

Type of Survey ¹	Number	Area Surveyed (acres)	% of total area Surveyed
Reconnaissance.....	8	2,177,000	23%
Detailed.....	19	1,133,000	22%
Total.....	27 ²	3,310,000	45% ³

¹ *Type of Survey*

Reconnaissance: Compilation of existing data, with field work only as necessary to corroborate other data.

Detailed: Extensive field work and mapping required, often down to 10-acre minimum. Detailed surveys may be carried out on a small watershed, often called a "little valley", or on a sample strip, or area of a larger watershed.

² *Number*

Both reconnaissance and detailed surveys have been carried out in several watersheds.

³ 45 per cent of the total area of 23 Authorities has been surveyed,—23 per cent on a reconnaissance scale, and 22 per cent in detail. When all 30 Authorities are considered (including those only recently formed), this becomes 31 per cent of their total area surveyed,—20 per cent in reconnaissance, and 11 per cent in detail.

Land Capability Classification

The end result of most of the surveys is a Land Capability Classification. Detailed Surveys are necessary to arrive at this classification. Complete information on land condition,—slope, erosion, drainage, soil character, stoniness, etc., is needed.

A summary of the distribution of land capability classes in 24 detailed surveys,* totalling 1,050,000 acres in 15 different Conservation Authorities is as follows:

%	Class	Description
9.1	I	Excellent land. May be used for intensive cultivation without limitation.
43.4	II	Very good land. May be used for cultivation with moderate limitations and a few conservation measures.
13.3	III	Good land, but with serious limitations. Needs many conservation measures in cultivation.
9.4	IV	Moderately good land, but with severe limitations, and should be used only for occasional cultivation and with great care.
8.7	V	Unsuited to cultivation because of wetness, flooding or stoniness. Few limitations for pasture or forestry.
5.5	VI	Unsuited to any cultivation, and has moderate limitations for pasture or forestry due to droughtiness, stones or steep slopes.
3.7	VII	Unsuited to any cultivation, and has severe limitations for pasture or forestry because it is either very steep, wet, or very rocky.
0	VIII**	Unsuited to any cultivation, or to pasture or forestry use. Such severe limitations as to be useful only for wildlife or recreation.

* These surveys were carried out in that part of Ontario broadly considered agricultural.

** Class VIII land is devoid of vegetation e.g.—areas of bare rock, bluffs and cliffs, "bandlands". While some Class VIII land is found in Ontario, none occurred in the areas surveyed.

FOREST

FOREST COVER

AGRICULTURAL SOUTHERN ONTARIO

Watershed	Total Area	Woodland	Woodland %
South Nation.....	976,528	150,675	15.6
Napanee.....	201,946	58,790	29.0
Moirs (south part).....	282,832	86,313	30.0
Ganaraska.....	65,911	17,029	25.8
Central Lake Ontario.....	154,880	14,287	9.6
Don.....	M.T.R.C.A.....	89,997	6.1
R.D.H.P.....		197,071	9.3
Humber.....		215,533	10.4
Etobicoke (Mimico).....	71,612	3,036	4.2
Upper Holland.....	59,808	8,438	14.1
Credit.....	213,387	35,030	16.3
Crowe (south part).....	58,573	25,425	43.4
Sixteen-Mile.....	102,000	17,395	17.0
Twelve-Mile.....	79,360	17,293	21.8
Spencer.....	64,000	11,408	17.8
Big Creek Region.....	393,026	67,817	17.3
Otter.....	202,222	30,638	15.2
Catfish.....	97,843	8,332	8.5
Speed.....	Grand.....	193,690	16.3
Conestogo.....		203,100	7.4
Irvine.....		53,190	6.1
Whiteman.....		93,950	9.1
Nith.....		276,576	8.1
Thames.....	896,949	57,025	6.7
Ausable.....	425,880	49,234	11.7
Middle Maitland.....	165,101	12,747	7.7
North Grey.....	418,880	103,503	24.9
South-Beatty.....	Saugeen.....	264,192	17.8
Upper.....		256,211	21.4
Lower.....		515,757	19.5
Sauble.....	257,984	88,025	34.1
	7,538,989	1,190,070	15.8

RECOMMENDED AUTHORITY FOREST

LAND CONDITION

Authority	Status of Recommended Authority Forest			Total Acres
	Open	Wooded	Bog, Slash and Scrub	
Ausable.....	18,270	17,617	1,626	37,513
Big Creek Region.....	3,180	8,925	636	12,741
Catfish.....	1,696	1,018	386	3,100
Central Lake Ontario.....	6,780	3,834	670	11,284
Credit.....	3,000	1,632	111	4,743
Crowe*.....	5,294	18,198	5,237	28,729
Ganaraska.....	12,495	6,942	396	19,833
Grand:—				
Conestogo.....	290	108	154	
Irving Creek.....	147	106	47	
Whiteman Creek.....	133	43	77	
Nith.....	4,406	4,396	648	10,555
Upper Holland.....	3,058	798	12	3,868
Junction.....	—	—	—	—
Metro. Toronto and Region:—				
R.D.H.P.....	1,953	649	81	
Don.....	2,743	824	33	
Humber.....	14,205	8,995	500	
Etobicoke-Mimico.....	950	754	285	31,987
Maitland.....	3,515	1,011	592	5,118
Moir*.....	47,740	44,502	3,336	95,578
Napanee.....	47,573	33,520	1,657	82,750
Neebing.....	653	9,960	797	11,410
North Grey.....	13,615	38,000	4,052	55,667
Otter.....	536	4,108	265	4,909
Sauble.....	26,028	84,271	9,646	119,945
Saugeen:—				
Upper.....	13,458	14,338	2,232	
Lower.....	15,620	40,434	2,913	
South Beatty.....	3,988	1,613	1,224	95,820
Sixteen-Mile.....	1,185	5,618	405	7,208
South Nation.....	77,839	82,009	38,228	198,076
Spencer.....	4,715	2,804	855	8,374
Twelve-Mile.....	2,170	6,459	1,075	9,704
Upper Thames.....	19,692	11,797	6,011	37,500
Totals—Acres.....	356,922	455,283	84,207	896,412

* Does not include part of watershed which was not surveyed.

SPECIAL COMMITTEE

AUTHORITY FORESTS

ACRES

Authority	1946	1951	1956	1960
Ausable.....	—	—	1,656	3,291
Big Creek Region.....	—	—	1,441	1,956
Credit.....	—	—	100	190
Ganaraska.....	—	4,396	7,222	7,802
Grand.....	—	—	2,259	4,559
Metro. Toronto and Region.....	—	—	1,017	1,317
Maitland.....	—	—	100	466
Moira.....	—	—	3,901	8,588
Napanee.....	—	—	2,325	4,263
Neebing.....	—	—	—	1,505
North Grey Region.....	—	—	—	2,337
Otter.....	—	—	—	758
Sauble.....	—	—	—	1,580
Saugeen.....	—	—	3,702	8,320
Upper Thames.....	—	—	2,800	3,225
Total Acres.....	0	4,396	26,523	50,157
Number of Authorities.....	0	(1)	(1)	(15)
Acquired per year.....	-879-	-4,425-	-5,908-	

WATER

PROJECTS COMPLETED OR UNDERWAY AS OF JANUARY 30, 1961

PROJECTS COMPLETED

Authority	Project	Cost \$*
LARGE DAMS AND RESERVOIRS		
Upper Thames.....	Fanshawe.....	4,912,443
Grand Commission.....	Shand.....	2,056,487
	Luther Marsh.....	233,985
	Conestogo.....	5,400,000
		12,602,915
CHANNEL IMPROVEMENTS		
Ausable.....	Grand Bend.....	25,260
Grand.....	Bridgeport.....	22,531
	Speed River at Guelph— Phases I and II.....	778,934
	Paris.....	3,788
Metropolitan Toronto and Region...	Long Branch—Channel and piers.....	226,665
	Don—York Mills.....	124,100
	Lower Don Dredging.....	69,436
	Black Creek—Channel at Lambton.....	306,680
	Lower Humber—3 reaches.....	1,061,516
North Grey Region.....	Indian River (Peasemarsch).....	1,000
Saugeen.....	Walkerton.....	13,521
Upper Thames.....	Ingersoll.....	1,002,992
	Mitchell—Phase I.....	35,000
		3,579,143
RIVER DIVERSIONS		
Ausable.....	Port Franks.....	158,802
Metropolitan Toronto and Region...	Brampton.....	976,600
	West Branch Don.....	9,701
		1,145,103

* Estimated where accounts not settled.

Authority	Project	Cost \$*
SMALL DAMS AND COMMUNITY PONDS		
Ausable.....	Morrison at Exeter.....	199,198
Big Creek Region.....	Sutton at Simcoe.....	15,000
Credit.....	Orangeville (land only).....	30,082
Crowe.....	Marmora.....	29,000
	Allan's Mills.....	2,000
Ganaraska.....	Garden Hill.....	14,000
Grand.....	Queen St. dam at Galt.....	3,574
	Grand Valley.....	15,468
	Wellesley.....	41,808
Holland.....	Fairey Lake.....	36,914
	Whitchurch.....	2,720
Metropolitan Toronto and Region...	Albion Hills.....	76,000
	Bolton.....	12,500
	Black Creek (retardation dam).....	392,000
	Oakbank.....	2,527
Moirs.....	Deloro.....	51,621
	Lingham Lake.....	8,400
Napanee.....	Second Depot.....	193,418
North Grey.....	Sydenham at Owen Sound.....	32,000
Sauble.....	McNab Lake.....	1,045
	Park Head.....	497
South Nation.....	Casselman.....	35,936
Upper Thames.....	Dorchester.....	9,296
		<hr/> 1,205,004
STREAM BANK EROSION CONTROL		
Grand.....	Whiteman and Horner Creeks.....	6,000
Middle Maitland.....	Listowel—retaining wall.....	11,863
Metropolitan Toronto and Region...	Don River at Queen St.—Toronto.....	69,804
Sauble.....	Zion.....	802
Saugeen.....	Saugeen.....	6,800
Upper Thames.....	Thames River—general.....	9,450
	Western University and St. Peters.....	26,160
	Steam Improvements:	
	Thamesford, Ingersoll, St. Mary's.....	460
		<hr/> 131,339
MAPPING AND ACQUISITION—FLOOD PLAIN LANDS		
Metropolitan Toronto and Region...	Mapping—Metropolitan Toronto Region....	54,630
	York Mills—Flood Plain Lands.....	77,900
		<hr/> 132,530
MISCELLANEOUS		
Big Creek Region.....	Erosion Control—Houghton Township.....	5,000
Catfish Creek.....	Ground Water Recharging—Aylmer.....	30,000
Metropolitan Toronto and Region...	Flood Control Pumping—Goodwood.....	30,938
	Extension Flood Warning System.....	9,500
		<hr/> 75,438
TOTAL COST OF PROJECTS COMPLETED.....		<hr/> <hr/> \$18,963,752

PROJECTS UNDERWAY

Authority	Project	Cost \$*
LARGE DAMS AND RESERVOIRS		
Upper Thames.....	Wildwood.....	1,962,400
	Woodstock.....	1,053,500
	Glengowan—including roadway.....	2,788,600
	Thamsford.....	2,520,100
	Cedar Creek.....	623,800
		<u>8,948,400</u>
SMALL DAMS AND COMMUNITY PONDS		
Sixteen-Mile.....	Kelso.....	350,000
Otter.....	Imperial Dam—Tillsonburg.....	10,700
Sauble.....	Shallow Lake.....	800
Upper Thames.....	Fanshawe.....	11,000
		<u>372,500</u>
CHANNEL IMPROVEMENTS		
Upper Thames.....	Mitchell—Phase II.....	35,000
	Mitchell—Phase III.....	292,500
	St. Marys.....	315,225
	Woodstock.....	84,375
Metropolitan Toronto and Region...	Black Creek—Lawrence Avenue.....	46,600
Middle Maitland.....	Listowel—Channel and dam capping.....	5,550
Grand.....	Guelph—Speed River Phase III.....	7,500
		<u>786,750</u>
STREAMBANK EROSION CONTROL		
Saugeen.....	Saugeen.....	250
FLOOD PLAIN LANDS ACQUISITION		
Metropolitan Toronto and Region...	Don—East Branch.....	60,500
	Lower Humber.....	41,400
	Etobicoke, North York, Vaughan.....	86,154
	Highland Creek.....	800,000
	Rouge—Scarborough.....	21,871
Otter.....	Otter—Norwich.....	800
		<u>1,010,725</u>
TOTAL COST OF PROJECTS UNDERWAY.....		<u>\$11,118,625</u>

In addition to the foregoing, many essential water projects are planned which are not yet underway. These projects are included in the summary below.

Summary

(a) Projects completed or underway.....	\$ 30,082,377
(b) Projects with plans completed to point of construction.....	20,228,405
(c) Projects with preliminary engineering only.....	68,357,000
(d) Projects for further investigation.....	16,726,500
	<u>\$135,394,282</u>

WILDLIFE

CONSERVATION AUTHORITY PROJECTS AFFECTING FISH AND WILDLIFE

1. NEW, RECLAIMED OR CONTROLLED WATERS FOR IMPROVED FISH AND WILDLIFE:

Ausable River Conservation Authority
Morrison Reservoir

Big Creek Region Conservation Authority
Backus Pond

Credit Valley Conservation Authority
Terra Cotta Ponds

Metropolitan Toronto and Region Conservation Authority
Glen Haffy Ponds

Moirs River Conservation Authority
Lingham Lake
O'Hara Mill Pond

Napanee Valley Conservation Authority
Second Depot Lake

Sauble Valley Conservation Authority
McNab Lake
Shallow Lake
Boat Lake
Isaac Lake
Sky Lake
Berford Lake

Upper Thames River Conservation Authority
Fanshawe Lake
Shakespeare Pond
Harrington Pond

2. FISH MANAGEMENT PROJECTS:

Ausable River Conservation Authority
Morrison Reservoir

Big Creek Region Conservation Authority
Waterford Lakes

Metropolitan Toronto and Region Conservation Authority
Heart Lake

Sixteen-Mile Creek Conservation Authority
Esquesing Pond

Upper Thames River Conservation Authority
Harrington Pond
Shakespeare Pond
Fanshawe Lake

3. REARING PONDS:

Metropolitan Toronto and Region Conservation Authority
Glen Haffy Ponds

Upper Thames River Conservation Authority
Fanshawe Borrow Pit

4. FISH HATCHERY:

Metropolitan Toronto and Region Conservation Authority
Glen Haffy Ponds

5. WILDFOWL IMPROVEMENT PROJECTS:

Grand River Conservation Commission
Luther Marsh

North Grey Region Conservation Authority
Bognor Conservation Area

6. NURSERIES PRODUCING SHRUBS FOR WILDLIFE:

Metropolitan Toronto and Region Conservation Authority
Boyd Conservation Area

Upper Thames River Conservation Authority
Fanshawe Park

7. NATURE TRAILS:

Metropolitan Toronto and Region Conservation Authority
Albion Hills Conservation Area
Boyd Conservation Area
Greenwood Conservation Area

Upper Thames River Conservation Authority
Fanshawe Park

8. UPLAND GAME INTRODUCTION:

Saugeen Valley Conservation Authority
Hungarian Partridges at Paisley, 1959.

(a successful introduction, as of 1961)

1962



Fourth Session—Twenty-fourth Parliament
1960-61

THE SENATE OF CANADA

PROCEEDINGS OF
THE SPECIAL COMMITTEE OF THE SENATE

ON

LAND USE IN CANADA

No. 11

WEDNESDAY, JUNE 28, 1961

The Honourable Arthur M. Pearson, Chairman
The Honourable Henri C. Bois, Deputy Chairman

REPORT OF THE COMMITTEE

APPENDIX
LIST OF WITNESSES, 1961 SESSION

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1961

SPECIAL COMMITTEE OF THE SENATE ON LAND USE IN CANADA

The Honourable Arthur M. Pearson, *Chairman*

The Honourable Senators

Barbour	Higgins	Pearson
Basha	Horner	Power
Bois	Inman	Smith (<i>Kamloops</i>)
Boucher	Leger	Stambaugh
Bradette	Leonard	Taylor (<i>Norfolk</i>)
Buchanan	MacDonald	Taylor (<i>Westmorland</i>)
Cameron	McDonald	Turgeon
Crerar	McGrand	Vaillancourt
Emerson	Méthot	Wall
Gladstone	Molson	White—31.
Golding		

(Quorum 5)

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate.

THURSDAY, January 26, 1961.

"The Honourable Senator Aseltine moved, seconded by the Honourable Senator Macdonald, P.C.—

That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to ensure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Bois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Méthot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.

After debate, and—

The question being put on the motion, it was—

Resolved in the affirmative."

J. F. MacNeill,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

WEDNESDAY, June 28, 1961.

Pursuant to adjournment and notice the Special Committee of the Senate on Land Use in Canada, met this day at 11.00 a.m.

Present: The Honourable Senators:—Pearson, *Chairman*; Bois, *Deputy Chairman*; Buchanan, Gladstone, Higgins, Horner, Inman, MacDonald, McGrand, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*) and Turgeon.

In attendance: Dr. M. E. Andal, Canada Department of Agriculture.

The Committee considered a draft report prepared by the Steering Committee.

After discussion, and with several amendments, the report was adopted.

At 11.45 a.m. the Committee adjourned.

Attest.

James D. MacDonald,
Clerk of the Committee.

REPORT OF THE COMMITTEE

WEDNESDAY, June 28, 1961.

The Special Committee of the Senate on Land Use in Canada make their second report as follows:

1. *Order of Reference*

The following resolution was adopted on January 26, 1961, by the Senate:—

“That a Special Committee of the Senate be appointed to consider and report on land use in Canada and what should be done to insure that our land resources are most effectively utilized for the benefit of the Canadian economy and the Canadian people and, in particular, to increase both agricultural production and the incomes of those engaged in it;

That the Committee be composed of the Honourable Senators Barbour, Basha, Bois, Boucher, Bradette, Buchanan, Cameron, Crerar, Emerson, Gladstone, Golding, Higgins, Horner, Inman, Leger, Leonard, MacDonald, McDonald, McGrand, Methot, Molson, Pearson, Power, Smith (*Kamloops*), Stambaugh, Taylor (*Norfolk*), Taylor (*Westmorland*), Turgeon, Vaillancourt, Wall and White.

That the Committee have power to engage the services of such counsel and technical and clerical personnel as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to sit during sittings and adjournments of the Senate, and to report from time to time;

That the evidence taken on the subject during the five preceding sessions be referred to the Committee.”

A Steering Committee was appointed as follows: Honourable Senators Basha, Bois, MacDonald, McDonald, Pearson, Smith (*Kamloops*), Stambaugh, Taylor (*Westmorland*), Taylor (*Norfolk*) and Wall.

Following the work of the two preceding sessions during which attention was directed towards the problems of small uneconomic farm units and the study of the rural development approach to improvement of conditions in low income rural areas, the Committee turned its considerations to the wider scope of the field of efficiency in use of our land resources. This the second report deals with the deliberations of the committee during the present session. It is not the intent of this report to discuss in detail the many submissions made to the committee during the course of their thirteen sittings as these have been released previously as printed proceedings. Instead, this report is made more in the form of a summary of the hearings of the present session followed by the recommendations of the Committee.

During the present session of the thirteen meetings, the Committee heard twenty witnesses. There were 341 pages of evidence presented to the Committee. The highly qualified men who were heard by your Committee covered a wide range of subjects. In this report the subjects discussed are grouped under four general headings. There was the group of briefs which could be considered under the general heading of agricultural land use improvement, there was the discussion of rural community problems in the Prairie Provinces, thirdly, there were witnesses who presented information on forest land use, and fourthly, submissions were received on urban land use.

In addition to the briefs that will be discussed under these four general headings, there were other briefs submitted which dealt with other related aspects of the terms of reference. These will assist materially in the completion of the full report of the Committee which is proposed for the next session.

I. AGRICULTURAL LAND USE IMPROVEMENT

(a) *Soil Erosion Control*

One of the submissions discussed for the Committee the importance of controlling erosion of our soils as a means of maintaining the productivity of our land resource. In this brief differences between Eastern and Western Canada were pointed out. In Eastern Canada most of the soil erosion that occurs is caused by water, due to the relatively higher rainfalls in the eastern part of the country and to susceptibility of some soils when not in the proper use to be eroded by water. In Western Canada water erosion is less of a problem due to smaller amounts of precipitation, but the lands of the Prairie Provinces are subject more to wind erosion. The use to which the land is put was stressed as the means of controlling both wind and water erosion. In Eastern Canada more of the land is under forest growth or is seeded to forage. This materially assists the control of both wind and water erosion. In the Prairie region the higher proportion of the land in grain crops and especially in summerfallow result in the land being more susceptible to wind erosion.

Attention was also drawn to the relation of soil type to erosion. Generally, the heavier soils—the clay, the silts, are more subject to water erosion. The opposite is true of wind erosion. The fine sandy soils are mostly affected by winds.

A second brief brought to the attention of the Committee the importance of considering differences in soils when determining the most desirable use of our agricultural lands. It was reported that 250 million acres of land have been covered in varying detail by soil surveys which includes about 85 to 90 per cent of our improved farm land in Canada. On the basis of this work, it was estimated that 5 per cent of the land presently being farmed should be removed from agriculture and put into forest and permanent grazing use. Ten per cent of our improved land, the Committee were told, could be considered excellent agricultural soils presenting few problems of management. The balance of 85 per cent of our improved agricultural land represent a wide range of productivity levels and a variety of land use problems. These lands are satisfactory if put to the uses for which they are most suited. Many of these soils may be viewed as having one preferred use. The use of particular soils must be viewed on both a regional and local basis in determining the most desirable use.

(b) *Reclamation and Development of Maritime Marshlands*

There are three main problems with regard to water which were considered by the Committee. These problems are the exclusion of water, the drainage of water and irrigation.

The work being carried out by the Maritime Marshlands Rehabilitation Administration was outlined for the Committee. This work exemplifies the first of the three problems. It was pointed out that of approximately 110,000 acres of marshland in the three maritime provinces, there are now about 80,000 acres protected from tidewater flooding. The administration is of a co-operative nature and the costs of its undertakings are borne by both senior levels of government. The extent of the work that has been performed is noted in that of the 80,000 acres now protected 11,000 acres was land that was seriously flooded by salt water prior to 1949. There are 123 projects involved ranging from 30 to 18,000 acres in size. These projects form parts of

property belonging to about 3,800 persons and form an integral part of an estimated 450,000 acres of farmland. Marshlands are more fertile than adjacent upland soils, and with proper management they supplement upland regions, as irrigated areas contribute to dry farm operations on the Prairies.

(c) *Drainage Improvement in Quebec*

Briefs concerning the needs of land drainage in parts of the Province of Quebec were received. One paper outlined programs that the provincial government has had underway for some years which encourage and assist the farmers to drain their lands. It discussed, in detail, the assistance offered persons in surface drainage, sub-surface drainage and related farm improvements. Assistance is also provided municipalities for the preparation and maintenance of municipal watercourses.

A second submission elaborated in more detail the need for drainage in many areas of Quebec. This brief also discussed the extension of the use of irrigation in some areas of Quebec.

In the discussion of drainage of agricultural lands of Quebec, it was estimated that about one million acres are presently being drained but that this should be extended by 10 million to 20 million acres. Attention was directed to the need for an educational program that would point out the benefits of drainage of many of Quebec soils.

(d) *Irrigation in Canada and Its Impact*

In proceedings No. 8 a brief which outlined irrigation in Canada is included. This brief discussed the history of irrigation as well as its extent and its use.

Seven factors were singled out and discussed as worthy of consideration when irrigation development is contemplated. These seven factors are: water supply, engineering, soil and other physical characteristics of the land, efficiency in use of water, climate, markets and human reaction.

Regarding the development of more irrigated land, the brief had this say—

There are those who question the expansion of irrigation in Western Canada at the present time, for dryland production appears to be adequate for our needs and even for creating surpluses, but we have been passing through a cycle of better than average natural precipitation. The situation may be different if we were to pass into a dry cycle, such as occurred in the thirties. Irrigated tracts so strategically located as there are in Western Canada within the most drought vulnerable parts of our country will be needed, particularly for forage to alleviate a situation which could create forced liquidation of valuable herds. Moreover, in building irrigation systems we are laying the foundation for food production in the future when Canada's needs will be much greater. Hence, public investment in irrigation development would seem to be justified.

(e) *Conservation with Particular Reference to Ontario*

A brief which discussed the wisdom and urgency of land use planning for Ontario in particular, and all of Canada generally, was considered by the Committee. The treatise which was presented the Committee argued very forcefully for safeguarding the better agricultural land and also for the need of acquiring and planning for more land for recreational purposes. In this presentation the requirements of land for forestry and wildlife uses were also discussed. The effect that taxes have on land use was also dwelt with in the brief with suggested changes in the tax structure being outlined. The relation of the limited water resource to land use was also considered.

The Conservation Authorities Act which was passed by the Ontario Legislature in the Spring of 1946 was explained to the Committee in a brief submitted. This Act enables all municipalities in a watershed to form a Conservation Authority which is a corporate body. The prime concern of the Conservation Authorities has been with the control of flooding and the increase of summer flow of their particular watercourses. Because of the need for protection of source areas of stream and rivers, the related aspects of land use have also concerned the Conservation Authorities.

When a Conservation Authority is incorporated, the provincial government of Ontario undertakes to appraise the conservation needs of the watershed. This appraisal is submitted to the Authority in the form of a detailed report. The report is written under six general headings: History, Land Use, Forestry, Water, Wildlife and Recreation. The findings are reported related to the major needs to be solved. When a scheme is undertaken by an Authority, it receives assistance both technically and financially from federal and the provincial departments of government. The brief outlined the assistance available in detail.

The enthusiasm with which the Act was received is indicated by the number of Authorities which have been formed. There have been 29 Authorities incorporated since 1946. The present area covered is 19,671 square miles; the number of municipalities, 434; and the total membership, 695. The total cost of engineering projects completed to date has been about 19 million dollars.

(f) Water Conservation in the Prairie Provinces

A brief was received by the Committee which discussed water conservation in the Prairies based upon 20 years of soil moisture research at Swift Current, Saskatchewan. The results it was pointed out are applicable to the wheat growing areas of the West. Water conservation in the context of the brief referred to storage in the soil of water from rainfall and snowfall and its subsequent use by crops.

In the brief various losses in water conservation were discussed. The greatest loss of water was through evaporation and the next most important loss of water was runoff before the frost leaves the soil. Other losses of water occur through deep percolation and through weed growth.

This brief discussed differing cultural practices which affect water conservation. It also pointed out the value of field shelterbelts especially in controlling erosion caused by wind.

The Committee received a brief which discussed the soil and water conservation activities of the administration of the Prairie Farm Rehabilitation Act.

As with the other briefs, it is not possible in this report to discuss all that was covered in this submission. It discussed the setting up of additional District Substations, land reclamation projects, regrassing and grazing research. It also reported on the work of the Prairie Farm Rehabilitation Act has carried out in tree planting, soil survey work, soil and economic research.

The brief also outlined the work carried on in pasture development; water conservation, community water storage projects, large multipurpose community projects, rehabilitation and resettlement of prairie lands.

Not attempting to indicate the overall value of the P.F.R.A. program some idea of the magnitude of their work may be had by a few examples. In the first ten years of their regrassing program from 1935 to 1945, it is estimated that 3,000,000 acres of farm land were influenced. At the present time P.F.R.A., in co-operation with the provinces of Saskatchewan and Mani-

toba, have 68 community pastures in operations. The area enclosed by the pastures is almost 2,000,000 acres. The pastures are made use of by about 6,500 farmers who graze approximately 123,000 head of livestock.

(g) Changes in Land Utilization in the Prairie Provinces

The Committee was addressed regarding changes in land utilization of the Prairie Provinces in which the factors responsible for the changes as well as some of the present aspects of use and needs for further adjustments were discussed.

In this discussion regarding the present aspects of use and needs for further adjustments, it was pointed out that the apparent reserve acreage represented by summerfallow and the inherent potentialities this presents for increasing production causes the present utilization to exert pressures which will result in wheat surpluses for some time. It was suggested that there will be required a substantial further shift away from wheat for the main park and wooded areas of the Prairies to relieve the tendency to surplus wheat production.

The reason offered for concern about permanence and stability of existing utilization which is characterized by increased acreage of summerfallow and oil seed production and a decrease of wheat acreage is that the indicated changes appear to have been introduced under pressure to divert, rather than in terms of more permanent incentives furnished by alternative production opportunities. These use-changes are temporary and speculative and could readily be reversed by some relief of existing market pressures or small changes of product opportunities.

In this discussion the view was expressed that the problems which characterize prairie agriculture are more than just a narrow problem of utilization but instead are in terms of general adjustments in the industry to give more opportunity for the adjustment and development of efficiency of the individual farm. The problem, it was stated, should be approached by getting more markets and market stability which will accommodate additional efficiency.

II. RURAL COMMUNITY PROBLEMS IN THE PRAIRIE PROVINCES

A brief was received by the Committee in which the community as a base for programming rural rehabilitation programs was discussed. Following a definition of a community, it discussed the adaptation of communities to rural modernization. Under this general heading, the submission dwelt with the changes brought about in rural communities by commercialization, mechanization and the declining and relatively more mobile rural population.

The fundamental nature of education to the successful adaptation of any rural readjustment program was an important feature of the brief. Education of the local people within a community was considered highly desirable but also more knowledge of the social sciences by extension personnel was advocated.

III. FOREST LAND USE

The Committee received a brief which outlined the views of the new federal Department of Forestry concerning land use problems as they relate to forestry. The department advocates a multiple-use concept in viewing the use of our land resources. It was pointed out that land being used for more than one purpose has a greater value than land that is put to only one use.

The multiple use of forest land was indicated by reference to its value not just as a source of timber but also as a source for water, forage, wildlife and recreation.

The presentation also reviewed briefly the importance of the forest industry relative to the national economy, pointing out that about twice as many dollars are received by Canada from newsprint export as from the export sale of wheat. Attention was also given to the various forms of tenure which the productive forest is under. The occupied forest from which the harvest of forest products is taken consists mainly of privately owned lands and Crown lands under lease or licence. The private forest, it was pointed out, are the most accessible, the most productive and the most adaptable to intensive forest management.

IV. URBAN LAND USE

(a) Land Use in the Metropolitan Regions of Canada

A brief that was presented to the Committee dealt with the transition zone that exists between urban built up areas and farm lands. The transition zone is the area where the transfer from agriculture to urban use occurs.

The problems that characterize the transition zone are the result of the sprawl type of urban development which results in higher costs for services. The urban sprawl breaks up economic farm units physically by the ribbon type of development as well as economically through higher taxes. The sprawl areas have occurred during the last 30 years as a result of universal motor car ownership and the accompanying road systems.

It was reported, based on a study of urban development around many of the larger Canadian cities, that farm land is lost to development at the rate of 382 acres per 1,000 population increase.

(b) Principles of Land Use in Orderly Urban Development

Some of the principles of land use that must be considered in orderly urban development were reviewed in another brief received by the Committee. Natural increase and immigration to an urban area were cited as the reasons for urban growth. The physical or geographic features of an urban area as well as the man-made features of political organization and transportation facilities were discussed in the brief as factors responsible for the shape of urban areas.

Urban development, the brief pointed out, was concerned with five types of land use, namely—industrial, residential, commercial, institutional and open space uses. Some of the fundamental characteristics of each of the five uses were discussed separately.

Further discussion in the brief centered around the value of urban zoning, the need for redevelopment of downtown centers and the interrelationship of urban centers with the surrounding regions.

In a very limited manner many of the briefs presented to the Committee this session have been reviewed and their pertinence to the study of land use has been indicated. As mentioned earlier, in addition to the briefs mentioned, there were other submissions received which will be valuable in the completion of the final report. A full report of the findings of the Committee since its formation is planned for the next session.

Points of similar nature were common to many of the briefs. The higher precipitation which is received in Eastern Canada as contrasted with the relatively drier prairie lands of Western Canada characterized points made in many of the submissions. Drainage problems and more forest use of the land in the East contrasted with the problems of moisture deficiency or drought conditions and the increased value of irrigation to Western lands.

The limited extent of the agricultural land resource of Canada was stressed in many of the briefs. Common also to many of the presentations made to the Committee was the need for more research especially as would apply to the field of land use planning and the field of extension.

RECOMMENDATIONS

The following recommendations result from study and deliberations of the Committee on the basis of information submitted during the present session.

- (1) that a system of financial assistance payments by senior governments be developed to recompense farmers on sub-marginal and marginal lands in appropriate areas to encourage reforestation of presently cultivated farm lands and sustained use management of present farm woodlots during a waiting period and until these lands attain a fair state of forest productive use.
- (2) that Federal and Provincial Governments arrange for the building up of a co-ordinated extension staff to work with the present Provincial extension staffs whose training should have particular emphasis on farm management and planning, rural development, principles and methods of community organization and development.
- (3) that further studies in co-operation with the provinces be made to the end that pollution of waters should be restricted by more effective measures and penalties.
- (4) due to the limited extent of good agricultural lands in Canada, it is recommended that the Federal Government speed up the survey being made by the Department of Mines and Technical Surveys of urban expansion of all metropolitan areas in Canada, so that there might be a basis of a more orderly development.
- (5) whereas the agricultural industry is subject to changing forces and periodically facing new economic and social problems and in a continuous process of use adjustment, the Committee believes it can serve a useful purpose in the public interest and recommends:
 - (a) that the Special Committee of the Senate on Land Use in Canada be a continuing committee and to be reconvened at each session,
 - (b) that authorization of the Committee under its order of reference be used to engage a research team or teams to assemble data and to make comprehensive studies and report to the Committee on (i) the state and incidence of rural taxation, (ii) requirements of land for future recreational use, (iii) conversion of marginal farm lands to forest use, (iv) river and lake pollution, (v) loss of good agricultural lands to urban sprawl, in all parts of Canada, and (vi) co-operation of Federal and Provincial Governments in a study of methods to combat forest fire losses.

All which is respectfully submitted.

ARTHUR M. PEARSON,
Chairman.

APPENDIX

List of Witnesses appearing before the Special Committee of the
Senate on Land Use in Canada

4th Session, 24th Parliament, 1961

Printed Proceedings No. 1

The Conservation Council of Ontario
Mr. Gavin Henderson, Executive Director

Printed Proceedings No. 2

The Lower Mainland Regional Planning Board
Mr. A. D. Crerar, Research Planner
The Canada Department of Agriculture
Dr. P. C. Stobbe, Director, Soil Research Institute
Dr. P. O. Ripley, Director, (Soils) Research Branch

Printed Proceedings No. 3

The Federal Department of Forestry
The Honourable Hugh John Flemming, Minister
Dr. J. D. B. Harrison, Deputy Minister
Mr. A. L. Best, Acting Chief, Forest Economic Division
The Federal Department of Fisheries
Mr. S. V. Ozere, Assistant Deputy Minister
Dr. A. L. Pritchard, Director, Conservation and Development Service
Mr. J. B. Rutherford, Assistant Director, Economics Service

Printed Proceedings No. 4

The National Capital Commission
Mr. Eric Thrift, General Manager
Mr. Douglas McDonald, Director of Planning and Property

Printed Proceedings No. 5

The Department of National Health and Welfare
Dr. C. D. W. Cameron, Deputy Minister
Dr. Joseph W. Willard, Deputy Minister

Printed Proceedings No. 6

The Quebec Department of Agriculture
Dr. Ernest Mercier, Deputy Minister
The Macdonald College of McGill University
Professor Angus Banting, Chairman, Department of Agricultural
Engineering

Printed Proceedings No. 7

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and the increased value of the submitted
J. Staple, Research Branch, P.F.R.A.
Shields, Director, P.F.R.A.

Printed Proceedings No. 8

The Canada Department of Agriculture

Mr. J. S. Parker, Director, Maritime Marshland Rehabilitation
Administration

The Maritime Federation of Agriculture

Mr. Ross Hill

Mr. Roy Grant, Secretary

The Canada Department of Agriculture

Dr. C. C. Spence, Economics Division, Edmonton, Alberta

Dr. J. C. Wilcox, Research Station, Summerland, B.C.

Dr. C. C. Russell, Experimental Station, Lethbridge, Alta.

Printed Proceedings No. 9

The University of Saskatchewan

Professor W. B. Baker, Director, Center for Community Studies

Professor H. Van Vliet, Department of Farm Management

Printed Proceedings No. 10

The Ontario Department of Commerce and Development

Mr. A. H. Richardson, Chief Conservation Engineer

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